

# Outdoor Air Quality

## Policy Position Statement

<b>Key messages:</b>	Poor air quality is a major but under recognised cause of significant ill health and mortality globally and in Australia. Major sources of anthropogenic air pollution are vehicle/transport emissions, domestic biomass burning such as wood heaters, landscape vegetation fires, agricultural emissions, industry and energy generation using fossil fuels. In Australia, air quality monitoring and regulation needs continuous improvement to adequately protect public health.
<b>Key policy positions:</b>	<ol style="list-style-type: none"><li>1. There is no known absolute safe level for inhalation of particulate matter so population exposure should be minimised</li><li>2. Australia's national air quality standards should be aligned with the 2021 World Health Organization (WHO) air quality guidelines, and greater regulatory efforts made to promote continuous reduction in emissions.</li><li>3. State based air quality monitoring needs to be enhanced to track short- and long-term exposures and provide better information to support public health and regulatory responses.</li><li>4. The health burden associated with pollution caused by wood heaters needs to be addressed through strengthened regulatory controls and a wood heater replacement scheme.</li><li>5. A subsidy scheme be established to support vulnerable populations to access high-efficiency air cleaners with in-built fine particulate (HEPA) filters</li><li>6. The current and future levels of urban infrastructure development, and vehicular, household (wood smoke) and industrial emissions in Australia demand urgent action from peak regulatory bodies to protect public health.</li><li>7. Enhanced effort is required to reduce combustion of fossil fuels, including incentivising uptake of electric vehicles (EV) and EV-related infrastructure, and other renewable, low-emitting sources of energy. Policy makers should promote clean outdoor air and ensure regulatory and monitoring mechanisms exist to mitigate impacts on population health.</li></ol>
<b>Audience:</b>	Federal, State and Territory Governments, policymakers and program managers, PHAA members, media.
<b>Responsibility:</b>	PHAA Ecology and Environment Special Interest Group
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PHAA notes the assistance provided by the research and policy work of the Centre for Air Pollution, Energy and Health Research (CAR) in updating this policy.

There are two inter-related components of air quality: indoor and outdoor (ambient) air quality. This policy position statement relates to outdoor (ambient) air quality.

### PHAA affirms the following principles:

1. There is no safe level of air pollution. All pollution matters.
2. The precautionary principle to protect human health through reduction of public exposure to air pollution should apply.
3. The provision of clean air is an environmental health priority that is best achieved through effective intersectoral collaboration between health, environment, industry and planning ministries, guided by up to date evidenced-based national standards, Commonwealth and State legislation, and effective regulatory standards, and State/Territory government action.
4. Industrial and infrastructure growth needs to be undertaken with adequate planning to reduce air pollution and protect health.
5. Health risk assessments, including those that form part of Environmental Impact Statements from development projects should fully quantify risks to population health including air pollution risks. Public and private sector organisations implementing infrastructure or industrial projects must be held accountable for health impacts of their developments on populations.
6. Increased fossil fuel emissions affect human health directly, through creation of particulate matter and other compounds and indirectly by increasing risk of extreme bushfires and dust storms through climate change. So, action on emissions reduction is fundamental to addressing outdoor air quality risks.
7. Implementing this policy would contribute towards the achievement of UN Sustainable Development Goals 3 – Good Health and Wellbeing, and 15 – Life on land.

### PHAA notes the following evidence:

8. Common outdoor air pollutants include particulate matter (PM) of varying sizes (<10 µm in aerodynamic diameter: PM<sub>10</sub>, <2.5 µm in aerodynamic diameter: PM<sub>2.5</sub>), ultra-fine particles (UFP), sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide, benzene, formaldehyde, ground level ozone, and volatile organic compounds.<sup>2</sup>
9. Air pollution is well established as a key health threat in urban environments across the globe.<sup>3, 4</sup>

10. Research has shown that long-term exposure to anthropogenic PM<sub>2.5</sub> in Australia is associated with over 2,500 deaths and costs Australians \$6.2 billion every year. **18.**
11. In particular, over the last 20 years, a vast body of medical and scientific research has emerged, linking various air pollutants with health problems.<sup>5-8</sup>
12. Adverse health effects are experienced at all levels in air pollution. **19** That is, there is no 'safe' level of air pollution below which adverse health effects have not been observed. This is true even in countries like Australia which, by international standards, have low levels of air pollution.
13. Some population groups are more vulnerable to health effects associated with air pollution: infants, children, pregnant women, the elderly, people with asthma, diabetes and immune compromised conditions.<sup>1</sup>
14. Global research confirms a causal association between exposures to air pollutants, particularly PM<sub>2.5</sub> and increased all-cause mortality, and increased incidence of heart disease,<sup>9</sup> stroke,<sup>10</sup> lung cancer,<sup>11</sup> low birth weight<sup>12, 13</sup>, Type II diabetes<sup>14</sup>, fetal development, preterm birth, brain development in children and dementia. **23**
15. Importantly, a steep risk in mortality from cardiac disease has been found even at low levels of exposure to some vehicular pollutants.<sup>15</sup> There is increased risk for respiratory problems, with nitrogen dioxide exacerbating asthma, and long-term exposure being associated with impaired lung development in children.<sup>8</sup>
16. Even short exposures to high levels of PM<sub>2.5</sub> (a few hours to weeks) is associated with cardiovascular mortality and illness, while longer-term exposure (over a few years) at lower concentrations may greatly increase the risk for cardiovascular mortality and reduce life expectancy among highly exposed groups.<sup>16</sup>
17. Based on the existing cancer research, especially for non-smokers, diesel emissions have been classified as carcinogenic by the WHO.<sup>17</sup>
18. The effect of air pollution on lung development in American school children 10 to 18 years of age was evaluated in the Children's Health Study.<sup>8</sup> Permanent impairment of lung development was found in those children exposed to higher levels of environmental air pollutants including PM<sub>2.5</sub>. One avoidable source of exposure for school children is from vehicles idling outside school gates. Some jurisdictions now have anti-idling laws for areas outside schools and childcare centres that prevent this exposure. **16.**
19. Substantial health benefits are achievable with modest decreases in air pollution. **20** The greatest gains occur through improvements in air pollution levels at lower concentrations because it is expected that that the dose response curve is steeper at lower air pollution concentrations.
20. In Australia, ambient air pollution is regulated by the Ambient Air Quality National Environment Protection Measures (NEPM) which aim to protect human health and well-being. These measures set standards for 6 air pollutants which jurisdictions report against. The NEPM set the overarching direction for protecting Australians' health.
21. The NEPM implies there is a 'safe' level of air pollution. Despite an update in 2021, NEPM thresholds for the majority of air pollutants remain higher than the WHO air quality guidelines. The NEPM values for PM<sub>2.5</sub> is nearly double those of the WHO air quality guidelines. **21**

22. Under the NEPM Act, states and territories are held accountable for meeting the NEPM standards simply through public reporting, though incidents or 'exceedances' are reported to the National Environment Protection Council on an annual basis. These reports can take years to become public thereby reducing their deterrent value.<sup>21</sup>
23. In addition to the impact of ambient air pollution, point source pollution also must be addressed. Point sources include residential sources, such as wood heaters, industrial areas, and high traffic density
24. The small number and limited coverage of air quality monitoring stations limits their capacity to detect changes in air quality at a local level, particularly for regional communities.<sup>21</sup>
25. The existing paradigm for management of air pollution focuses on 'ambient' air measured away from any point source or busy road. Urban monitoring stations do not monitor the impact of point sources of pollution (where air pollution levels are much higher), such as busy roads, or wood heater smoke unless it occurs in close proximity of the monitoring station.
26. The major sources of air pollution in Australia are road vehicles, coal fired electricity generation, wood fired heating, bushfires and other landscape fires, and coal mining. Not all of these are amenable to control measures. An economic analysis of the US Clean Air Act showed that implemented air pollution control measures had benefits much greater than the cost, with a benefit: cost ratio of 25:1<sup>18</sup>
27. Only 10 per cent of Australian homes have wood heaters <sup>21</sup> and yet wood heater smoke is a major contributor to air pollution in urban and regional communities across Australia. For example, in Sydney and Melbourne, wood heater smoke is the number one source of human made PM<sub>2.5</sub>.<sup>22</sup>
28. Researchers have estimated that around 100 deaths per year are attributed to long term exposure to PM<sub>2.5</sub> from wood heaters in the Greater Metropolitan Region of NSW. This is more than deaths from PM<sub>2.5</sub> generated by power stations (45 deaths) and traffic (72 deaths).
29. Use of air cleaners with HEPA filters indoors is one of the few proven mechanisms to protect community members, particularly those people at risk from the air pollution from landscape fires including planned burn offs, and wood heater smoke. <sup>21</sup>
30. On-road traffic emissions represent an important source of PM<sub>2.5</sub>. In Sydney and Melbourne, motor vehicles represent the second largest source of PM<sub>2.5</sub>. Researchers have estimated that the long-term exposure to traffic related PM<sub>2.5</sub> is associated with approximately 70 deaths per year in the Greater Metropolitan region of NSW.
31. Reduction of private vehicle use through improving public and active transport, has health co-benefits, by improving physical activity levels in addition to reducing accident risk and air pollution from transport sources.
32. The replacement of conventional vehicles with electric vehicles (EVs) not only assists Australia meet its climate goals and reduce greenhouse gas emissions but would also decrease transport related air pollutants. The current price and lack of EV-related infrastructure is a deterrent to most Australians.
33. Implementing this policy would contribute towards the achievement of [UN Sustainable Development Goal 3 – Good Health and Wellbeing](#).

PHAA seeks the following actions:

34. At a minimum, alignment of Australia's Air Quality Standards with 2021 WHO Global Air Quality Guidelines.
35. Establishment of a national policy framework that aims to continuously reduce the population's exposure to air pollution.
36. Establishment of a National Environment Protection Agency with responsibility for setting air quality standards and overseeing implementation by the states and territories via a National Clean Air Agreement.
37. Increase coverage of validated air quality, monitoring networks by states and territories, including inclusion of (but not reliance on) citizen-based and business-based monitoring systems that particularly addresses issue of geographic inequalities and identifies pollution hot spots.
38. Ambient air pollution should be measured by state government agencies with these data provided to the public in both real time and available as downloadable historical data, such as is currently available in NSW.
39. Effective regulatory response to exceedances of air quality standards including evaluation of the problem, public health impacts and proposed steps to remediate and accessible advice to the affected communities (with a particular focus on vulnerable groups).
40. Legislation for a 75% reduction in greenhouse gas emissions below 2005 levels by 2030 and net zero greenhouse gas emissions by 2035 as recommended by the best available science.
41. Introduction of policies that allow Australians to purchase, maintain and easily charge electric vehicles.
42. Australia should immediately adopt the Euro 6 standards for new light vehicles and Euro VI standards for new heavy vehicles and take active steps to retire highly polluting older vehicles, especially those using diesel fuel.
43. Introduction of national policy to reduce wood heater emissions including a fund to incentivise the replacement of wood heaters in existing homes and discourage the inclusion of wood heaters in new homes in populated areas. Policy also needs to include more stringent emissions standards, a central wood heater register and a public health promotion program.
44. Where air pollution is unavoidable, community harm should be reflected in a polluter pays fee system, such as the Load Based Licensing system in NSW with fees accurately reflecting the community cost of the health harm.
45. Coal fired generators in Australia should have emissions licences for particulate matter, SO<sub>2</sub> and NO<sub>2</sub> in line with international best practice.
46. Continued research funding on the health effects of exposure to air pollutants, the synergistic influence of climate-related factors, characterisation of the sources of air pollution, monitoring regimes, and standards for exposure close to busy roads, and economic analysis of the benefits of pollution reduction – with research disseminated to the public health, scientific and medical communities, governments, businesses and the general community.
47. The expansion of monitoring of chemical composition of particulate matter.

**PHAA resolves to:**

48. Advocate for the above steps to be taken based on the principles in this position statement.
49. Collaborate with researchers and community organisations to promote better action on air pollution and continued funding of a comprehensive research program.

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**(First adopted 2016)**

## References

1. Sacks JD, Stanek LW, Luben TJ, Johns DO, Buckley BJ, Brown JS, et al. Particulate matter-induced health effects: who is susceptible? *Environ Health Perspect*. 2011;119(4):446-54.
2. Barnett AG. It's safe to say there is no safe level of air pollution. *Australian and New Zealand journal of public health*. 2014;38(5):407-8.
3. OECD. *The Cost of Air Pollution: Health Impacts of Road Transport*. Paris: OECD Publishing; 2014.
4. Kuehn BM. WHO: More Than 7 Million Air Pollution Deaths Each Year - Medical News & Perspectives. *JAMA*. 2014;311(15):1486-.
5. Beelen R, Raaschou-Nielsen O, Stafoggia M, Andersen ZJ, Weinmayr G, Hoffmann B, et al. Effects of long-term exposure to air pollution on natural-cause mortality: an analysis of 22 European cohorts within the multicentre ESCAPE project. *The Lancet*. 2014;383(9919):785-95.
6. Pope III CA, Burnett RT, Thun MJ, Calle EE, Krewski D, Ito K, et al. Lung cancer, cardiopulmonary mortality and long-term exposure to fine particulate air pollution. *JAMA*. 2002;287(9):1132-41.
7. Hoffmann B, Moebus S, Mohlenkamp S, Stang A, Lehmann N, Dragano N, et al. Residential exposure to traffic is associated with coronary atherosclerosis. *Circulation*. 2007;116(5):489-96.
8. Gauderman WJ, Avol E, Gilliland F, Vora H, Thomas D, Berhane K, et al. The Effect of Air Pollution on Lung Development from 10 to 18 Years of Age. *New England Journal of Medicine*. 2004;351(11):1057-67.
9. Peters A, Dockery DW, Muller JE, Mittleman MA. Increased particulate air pollution and the triggering of myocardial infarction. *Circulation*. 2001;103:2810-5.
10. Wellenius GA, Burger MR, Coull BA, Schwartz J, Suh HH, Koutrakis P, et al. Ambient air pollution and the risk of acute ischemic stroke. *Arch Intern Med*. 2012;172(3):229-34.
11. Raaschou-Nielsen O, Andersen ZJ, Beelen R, Samoli E, Stafoggia M, Weinmayr G, et al. Air pollution and lung cancer incidence in 17 European cohorts: prospective analyses from the European Study of Cohorts for Air Pollution Effects (ESCAPE). *The Lancet Oncology*. 2013;14(9):813-22.
12. Bell ML, Belanger K, Ebisu K, Gent JF, Leaderer BP. Relationship between birth weight and exposure to airborne fine particulate potassium and titanium during gestation. *Environmental research*. 2012;117:83-9.
13. Rich DQ, Liu K, Zhang J, Thurston SW, Stevens TP, Pan Y, et al. Differences in Birth Weight Associated with the 2008 Beijing Olympics Air Pollution Reduction: Results from a Natural Experiment. *Environ Health Perspect*. 2015;123(9):880-7.
14. Bowe B, Xie Y, Li T, Yan Y, Xian H, Al-Aly Z. The 2016 global and national burden of diabetes mellitus attributable to PM 2.5 air pollution. *The Lancet Planetary Health*. 2018;2(7):e301-e12.
15. Pope III CA, Burnett RT, Turner MC, Cohen A, Krewski D, Jerrett M, et al. Lung cancer and cardiovascular disease mortality associated with ambient air pollution and cigarette smoke: shape of the exposure-response relationships. *Environ Health Perspect*. 2011;119(11):1616-21.
16. Brook RD, Rajagopalan S, Pope CA, 3<sup>rd</sup>, Brook JR, Bhatnagar A, Diez-Roux AV, et al. Particulate matter air pollution and cardiovascular disease: An update to the scientific statement from the American Heart Association. *Circulation*. 2010;121(21):2331-78.
17. International Agency for Research on Cancer. Diesel and gasoline engine exhausts and some nitroarenes. IARC Monographs on the evaluation of carcinogenic risks to humans, Vol 105. Lyon, France: WHO; 2013.
18. U.S. Environmental Protection Agency. The benefits and costs of the Clean Air Act from 1990 to 2020: Summary report. <https://www.epa.gov/sites/production/files/2015-07/documents/summaryreport.pdf>: US EPA; 2011.

- 18.. Hanigan IC, Broome RA, Chaston TB, et al. Avoidable mortality attributable to antropogenic fine particulate matter (PM2.5) in Australia. *International Journal of Environment Health Research and public health* 2021;18 (1): 254
19. Zosky GR, Vander Hoorn S, Abramson MJ, et al, Principles for setting air quality guidelines to protect human health in Australia. *Medical Journal or Australia*, 2021; 214 (6): 254-56. e1
20. Broome RA, Fann N, Cristina TJN, et al. The health benefits of reducing air pollution in Sydney, Australia. *Environmental research* 2015; 143: 19-25
- 21 Centre for Air Pollution, energy and health, *Cleaner Air for Australians: Policy priorities for the 2022 federal election*,
- 22 EPA, *Reducing-Wood-Smoke-Emissions*, [Available from: <https://www.epa.nsw.gov.au/your-environment/air/reducing-wood-smoke-emissions>]
- 23 European Respiratory Society, *The Health Impact of Air Pollution: An expert report of the International Society for Environmental Epidemiology (ISEE) and the European Respiratory Society (ERS)*, 30 January 2019, [https://www.ersnet.org/wp-content/uploads/2021/04/HZ\\_Positionspapier\\_ENG\\_1900402.pdf](https://www.ersnet.org/wp-content/uploads/2021/04/HZ_Positionspapier_ENG_1900402.pdf)