WOOD HEATERS AND ASTHMA POLICY POSITION STATEMENT

May 2023

INTRODUCTION

Wood heater smoke is the largest source of winter air pollution in areas including Sydney, Canberra and Tasmania,[1] yet just 7% of Australian households use wood heaters as their main source of heating.[2] Evidence from Tasmania suggests more people die from wood heater smoke than bushfire smoke,[3] although consumer research shows more people are concerned by bushfire smoke.[4]

Wood heater smoke contains harmful pollutants including fine particulate matter ($PM_{2.5}$) and known carcinogens. There is no 'safe' level of air pollution and health impacts can occur even at low levels of pollution, well below the Australian standards for ambient air pollution.[5] Wood heater smoke is a serious risk factor for asthma, both in terms of developing asthma and triggering symptoms in people who already have asthma.[6] It is also a risk factor for other respiratory illnesses, certain cancers, cardiovascular disease, premature birth and premature death.[7]

These health impacts result in substantial economic costs, which have been estimated annually in excess of $3,800 per wood heater.[8] In Tasmania alone, the average yearly health cost of wood heater smoke is an estimated $293 million.[9]

> *People who have asthma and other respiratory conditions are very badly affected by the smoke from these heaters; my neighbour has asthma and suffers terribly because here in Canberra and in surrounding areas, there are a lot of these wood heaters.*
>
> Kambah, ACT

Wood heater smoke levels vary between regions, but poor air quality from wood heaters can occur even in regions where only a small proportion of homes use them. Wood heater use is more common in the colder states and territories where their use peaks in winter.[10] Smoke from wood heaters is more problematic in areas where conditions prevent it dispersing.[11] There are many factors that determine whether wood heater smoke accumulates in a location, including wind speed and direction, temperature, topography and the concentration of wood heaters in that area.[12] Wood heater smoke can be problematic in regional towns, such as Armidale in NSW, as well as in major population centres, such as Greater Metropolitan Sydney.

Quotes throughout this position statement are drawn from Asthma Australia's 2021 Wood Heaters and Health Survey

In November 2020, Asthma Australia commissioned a nationally representative survey of over 25,000 people.[13] We aimed to understand the impacts of wood heaters on the people who use them and their communities, and the beliefs people hold about wood heater use and relevant policy or public health actions. The research found people exposed to wood heaters are largely unable to protect themselves against wood heater smoke when it is present, and that people are supportive of regulations to reduce the impact of wood heaters, with even stronger support among people with asthma.

Asthma Australia calls on all levels of government to implement reforms to minimise the health impacts of wood heater pollution, including policies to phase out wood heaters in residential areas where smoke can cause localised air pollution, and a national AirSmart health promotion campaign to educate people about the health impacts of air pollution more generally.

ABOUT ASTHMA AUSTRALIA

Asthma Australia is a for-purpose, consumer organisation which has been improving the lives of people with asthma since 1962. Asthma affects one in nine Australians or 2.7 million people. Asthma is an inflammatory condition of the airways which restricts airflow and can be fatal. There is no cure, but most people with asthma can experience good control.

Our purpose is to help people breathe better so they can live freely.

We deliver evidence-based prevention and health strategies to more than half a million people each year.

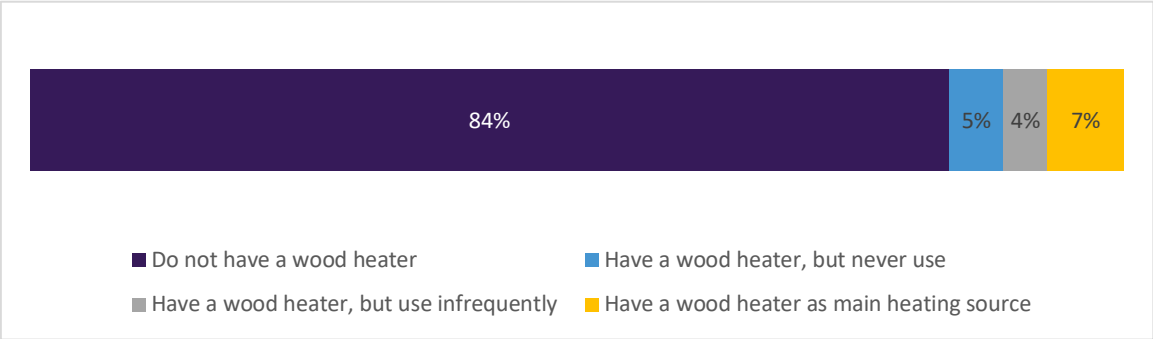
WOOD HEATER USE

Asthma Australia's Wood Heaters and Health Survey[14] found 11% of Australians reported owning and using a wood heater. Seven per cent reported wood heating was their main source of heating (see Figure 1). Wood heater use is higher in cooler states and territories, with 13% of people in Tasmania and 14% of people in the Australian Capital Territory reporting they use a wood heater as their main source of heating. Wood heater ownership and use is also higher in regional and rural areas across the country.

It gets pretty bad here [in Bendigo] because even in the new housing areas where we are, a lot of people have installed wood-fire heaters; I would say at least half of the homes built in the last five years that I know would have one.

Bendigo, VIC

Figure 1: Wood heater use amongst respondents to Asthma Australia's Wood Heaters and Health Survey



WOOD HEATER SMOKE AND HUMAN HEALTH

Wood heater smoke contains a range of pollutants including particulate matter, carbon monoxide and volatile organic gases. Fine particulate matter, known as $PM_{2.5}$, is made up of small particles (2.5 micrometres and smaller in size) that are the most concerning for health because they are able to penetrate deep into the lungs and directly pass into the bloodstream.[15] Evidence shows there is no safe level of exposure to $PM_{2.5}$, meaning even low levels of air pollution have negative health consequences.[16]

People with asthma are among those most vulnerable to particulate matter exposure, including from wood smoke.[17] Findings from Asthma Australia's survey show people with asthma are twice as likely to experience respiratory symptoms when exposed to wood heater smoke compared to the general population: nearly one-quarter of people with asthma (23%) reported respiratory symptoms compared with 11% of the general population.[18]

People with other respiratory illnesses are also particularly vulnerable to wood heater emissions, as are pregnant people, children and elderly people.[19] Exposure to emissions has been associated with certain cancers, cardiovascular and respiratory hospital admissions and emergency department visits, premature birth and premature death.[20]

Research has estimated that wood heater smoke causes significant health impacts in Australia. See boxes below.

Research focus 1: Long-term exposure to $PM_{2.5}$ from wood heaters causes more deaths than $PM_{2.5}$ from traffic and power plants in Greater Metropolitan Sydney[21]

Wood heater smoke has been found to be the largest source of anthropogenic fine particulate matter ($PM_{2.5}$) in the Greater Metropolitan Region of Sydney and to have significant health impacts. Researchers modelled the impacts of $PM_{2.5}$ from eight major sources in 2010-11. They found wood heaters were the largest source of anthropogenic $PM_{2.5}$ emissions and contributed nearly one-quarter of the population weighted annual average concentration of $PM_{2.5}$, despite being used by just 4.4% of residents as their main source of heating. The highest levels of $PM_{2.5}$ from wood heaters were found in areas with high population density (with the one exception being a coal mining area). Long-term exposure to $PM_{2.5}$ from wood heaters was found to be associated with 100 deaths, more than exposure to $PM_{2.5}$ from power stations (45 deaths) and on-road traffic (72 deaths). It was also associated with 1,400 Years of Life Lost (or YLL, a measure of premature mortality) compared to 620 YLL for exposure to $PM_{2.5}$ from power stations and 990 YLL for on-road traffic.

Research focus 2: The significant health costs of wood heater smoke[22]

University of Tasmania research suggests wood heater smoke is significantly more problematic from a health perspective than bushfire or hazard reduction burn smoke in Tasmania. Researchers modelled and compared the health impacts of smoke from wood heaters and landscape fires (including bushfires and hazard reduction burns) in Tasmania between 2010 and 2019. They estimated that wood smoke from these sources combined caused 69 premature deaths, 86 hospital admissions and 15 asthma emergency department visits annually. When comparing how many of these could be attributed to smoke from wood heaters versus landscape fires, they found the majority of health impacts (74%) were attributable to wood heaters. The researchers also calculated associated health costs and found wood heater smoke costs Tasmanians 18 times more ($293 million) than landscape fire smoke ($16 million).

Research focus 3: Wood heater smoke may result in more cumulative exposure to air pollution than bushfire smoke[23]

Researchers measured air quality in a suburb of western Sydney over 18 months in 2016 and 2017. They compared the change in $PM_{2.5}$ resulting from five hazard reduction burn events with the presence of domestic wood heater smoke. They found that although $PM_{2.5}$ levels were higher during hazard reduction burns, the cumulative exposure to $PM_{2.5}$ was higher with wood heater smoke. This is because periods of smoke from wood heaters happened more frequently and lasted longer than those from hazard reduction burns. They concluded that policymakers should place greater importance on wood heater smoke.

LOCAL AIR QUALITY MONITORING AND REPORTING

Local air quality information is essential for people to be able to understand when wood heater emissions reach harmful levels in their neighbourhood. However, the number of locations where air quality data is collected varies between jurisdictions. Air quality monitoring sites are often selected based on population density and size, which means many regional and rural populations lack adequate local air quality monitoring.

Additionally, because air pollution from wood heaters is highly localised to streets or neighbourhoods, the true extent of wood heater pollution is not likely being detected by official air quality monitors, which are geographically dispersed.[24] In 2020, a NSW Parliamentary Committee Inquiry into the health impacts of poor air quality recommended the NSW Government expand its Air Quality Monitoring Network and consider using low cost sensors to ensure local air quality data is available in as many localities as possible.[25]

CONSUMER UNDERSTANDING OF THE HEALTH IMPACTS OF WOOD HEATER SMOKE

A significant issue with wood heater smoke is that people are affected by the actions of others (typically neighbours) and have limited capacity to take preventive action. This is comparable to passive smoking.[26] A further challenge is that because of Australia's 'leaky' houses, people are exposed to wood heater smoke despite having their doors and windows closed, which they are encouraged to do when ambient air pollution is present to reduce their exposure to it. Asthma Australia has heard anecdotal reports of consumers moving house to avoid wood heater smoke from neighbours, at their own expense. Not only is this option not available to everyone, but there is also no assurance that people can find a new neighbourhood where wood heaters are not used.

The lack of ability to prevent exposure to wood heater smoke was evident in the results of Asthma Australia's Wood Heaters and Health Survey.[27] Most people who experience respiratory symptoms said they do not feel they are able to reduce their exposure to wood heater smoke. Only 28% of the general population and 18% of people with asthma said they are able to protect themselves from wood heater smoke. A common response from people on how they attempt to protect themselves when smoke is present outside is staying inside with their doors and windows closed. This is not a practical solution, as wood heater smoke is a persistent problem throughout affected regions in the colder months and people may be exposed daily or multiple times a week. It is also unlikely to protect the many people living in homes that are not well-sealed.

People with asthma like my sister-in-law suffer the most in terms of health impact. She lives in the Lenah Valley (Hobart) and basically has to live in the house with all the doors and windows shut from May-September because it induces asthma attacks.

Mount Stuart (Hobart), TAS

REGIONAL IMPACTS OF WOOD HEATER SMOKE

The health burden of wood heater smoke is not evenly distributed, and wood heaters are a bigger problem in states and territories that experience colder weather. In Tasmania, the ACT and NSW, wood heaters are the largest source of anthropogenic air pollution in winter.[28]

Asthma Australia's survey revealed 7% of respondents used wood heaters as their main source of heating. This was higher in cooler states and territories, with 13% of people in Tasmania and 14% of people in the Australian Capital Territory reporting they use a wood heater as their main source of heating.[29]

The prevalence of wood heaters also varies between regions of a state or territory. For example, around half of households in Armidale use wood heaters[30] compared with just 4% of households in the Greater Metropolitan Region of Sydney.[31] Yet, despite the relatively low number of wood heaters in the Greater Metropolitan Region of Sydney, they are still the largest contributor to anthropogenic $PM_{2.5}$ (see Research focus box 1 above).

Wood heater smoke is also a bigger problem in areas where conditions mean wood heater smoke is less likely to disperse.[32] Topographic features can 'trap' pollution, as seen in Sydney, which has a basin shape,[33] and in Launceston in Tasmania, which is in a river valley.[34] These features can combine with meteorological conditions to create inversion layers, which further limit dispersal of pollution.[35]

Case Study 1: Armidale, New south Wales

Wood heaters are common in the NSW regional town of Armidale and the town experiences increased pollution levels as a result of geographic features that create inversion layers. Wood heater smoke has been estimated to cause an additional 750 GP visits each winter, and a local GP reportedly advised people to move away from the town if they had lung conditions.[36] There has been considerable local action to minimise the health impacts of wood heater smoke. Armidale Regional Council now requires an application to be submitted for any installation or replacement of wood heating appliances with the aim of ensuring compliance with air pollution standards and prevention of smoke inhalation by neighbours.

Case Study 2: The cost of wood heater emissions in Victoria

A Policy Impact Assessment[37] prepared for Victoria's Environment Protection Authority in 2017 assessed the health costs of wood heater emissions and the benefits of various regulatory interventions to reduce emissions. It quantified the total health costs of wood heater emissions at more than $8 billion over 10 years. The Policy Impact Assessment found that accelerating the replacement of existing wood heaters was by far the most effective intervention in terms of avoiding particulate matter emissions and would result in the greatest net benefit at over $462 million. In comparison, adopting an efficiency standard would deliver a net benefit of under $33 million, and tightening the emissions standard for wood heaters would have a net benefit of just over $28 million. In late 2020, the Victorian Government announced a household energy efficiency package that included a rebate program to replace old heaters, including wood heaters, with energy efficient reverse-cycle air conditioners.[38] Its focus was on concession card holders or those with low household incomes. Under the program, rebates of $1,000 contributed to the cost of replacing gas, electric and wood heaters.

Case Study 3: Launceston, Tasmania

Wood heater smoke has been recognised as the biggest air quality concern in Tasmania[39] where the second largest city of Launceston became a focus for strategies to reduce wood heater pollution.[40] Wood heaters became more popular throughout Tasmania in the 1980s and 1990s and they could be found in two-thirds of Launceston households in 2001. A program of interventions began that year and by the end of the program in 2004, wood heater prevalence was reduced to 30% of households. Researchers studying the impact of these interventions measured air pollution before and after the interventions, finding a significant decrease in annual coarse particulate matter (PM_{10}) pollution and an even greater decrease in winter air pollution levels.[41] This was associated with a reduction in cardiovascular and respiratory mortality for males during winter months.

BACKYARD FIRE PITS

Anecdotally, backyard fire pits are becoming more popular. Consumer reports to Asthma Australia indicate fire pits became problematic in Brisbane after the city's council lifted a ban on backyard burning in 2020.[42] Health and environmental authorities across the world have issued warnings about their use with concerns about air pollution, bushfire danger and the impact on groups vulnerable to air pollution, including people with respiratory conditions.[43]

WOOD HEATING AND CLIMATE CHANGE

Wood heating exacerbates the impacts of climate change. Firewood production and use can be considered carbon dioxide-neutral if the carbon dioxide emitted is accounted for by replacement of trees. However, this is not the case in Australia where emissions studies have shown domestic wood heating emissions are significantly underestimated.[44] Burning wood – even the more sustainable types – produces toxic pollutants such as methane and black carbon particles, which damage the environment, aggravate climate change and negatively impact human health.[45]

REGULATORY APPROACHES TO WOOD HEATERS

In Australia, regulation of wood heaters is complex, with responsibility shared across all levels of government. Wood heating appliances and their emissions are governed by Australian Standards, which need to be legislated by state and territory governments to be enforceable. State and territory governments are also responsible for monitoring and regulating emissions, although this is often delegated to local governments.

However, the current standards are not sufficient to protect communities from wood heater smoke because they do not reflect 'real world' heater use.[46] That is, how a heater is used in real life is likely to be far more polluting than when the same heater is used in an idealised laboratory testing

procedure. According to the Centre for Air pollution, energy and health Research (CAR), many factors impact how polluting a wood heater is and the laboratory test used for setting standards does not include the startup phase, which is the most polluting part of wood heater operation.[47] Additionally, the current limit for wood heater particulate emissions of 1.5g/kg is too high.

Using incentives to reduce the number of wood heaters in residential areas through buy-back schemes or subsidies for installing alternative heating methods has been proposed as an important solution to reduce the health impacts of wood heater smoke in populated areas.[48] Wood heater replacement programs have been introduced to reduce the number of wood heaters in some areas where their emissions are problematic. For example:

- In 2001, a coordinated approach to reduce air pollution from wood heaters was implemented in Launceston (refer to Case study 3), which included a wood heater replacement program, enforcement of environmental regulations and a community education campaign. These interventions resulted in a dramatic drop in wood heater prevalence, from 66% of homes having wood heaters to just 30% by the end of the program in 2004. Evaluation of the intervention found there was decreased air pollution, which was associated with reduced cardiovascular and respiratory mortality among males during winter in Launceston, compared to Hobart where no interventions were implemented.[49]

- The ACT Government's Actsmart Wood Heater Replacement Program aims to improve Canberra's air quality by offering financial incentives to remove wood heaters and install efficient, electric reverse cycle air conditioning.[50] The Australian Medication Association and other health groups have called for wood heater replacement schemes to be introduced in other states and territories.[51]

- The Christchurch Clean Heat Project in New Zealand intended to improve air quality by removing wood heaters. It provided financial support towards replacing them with low emission heaters and improved insulation. As a result, wood heaters were replaced with reverse cycle air conditioners in 1,973 households.[52]

Other regulatory approaches to phasing out wood heaters in residential areas include prohibiting their installation and requiring them to be removed when a home is sold.[53]

In addition to reforms aimed at phasing out wood heaters, governments have implemented education campaigns around minimising emissions from existing wood heaters. For example, the NSW Environmental Protection Agency has a resource kit for local governments to help educate communities.[54] However, research has shown that education campaigns have only contributed to reductions in air pollution from wood heaters when they are combined with measures to reduce the number of wood heaters in a community.[55] Additionally, Asthma Australia's consumer survey into wood heaters found relatively low public support for community education as a means to reduce wood heater smoke (see table 1 below).[56]

Education around wood heaters should instead focus on raising community awareness about the health and safety risks associated with wood heaters, for example, requiring point of sale labelling to warn potential wood heater buyers about health risks and including health risk messaging in government materials about wood heaters.[57]

Consumer attitudes towards regulating wood heaters

In Asthma Australia's consumer survey[58] into wood heaters, 77% of the general population agreed that wood heaters should not be allowed in urban or built-up areas. This was even higher among people with asthma (84%). More than half of the general population supported wood heaters being phased out with a subsidy (55%) or banned (54%). People with asthma were particularly supportive of phasing out (71%) or banning (65%) wood heaters.

In general, more people supported regulations or restrictions on wood heaters, compared to requiring people to inform their neighbours before using their wood heater or community education about correct wood heater use and how to reduce associated smoke. This suggests people want stronger government action. This is likely underpinned by most respondents feeling that they are unable to protect themselves from wood heater smoke caused by the actions of others.

People were most supportive of regulations that restrict the use of wood heaters in urban or built-up areas. However, results from the survey show people in regional and rural areas are more likely to be exposed to wood heaters, and on a more frequent basis than those in metropolitan areas.

Table 1: Responses from Asthma Australia's Wood Heaters and Health Survey on the use and regulation of wood heaters (n=25,039)[59]

Statement	All (%)			People with asthma (%)		
	Disagree	Neutral	Agree	Disagree	Neutral	Agree
Wood heaters should not be allowed in urban or built-up areas	20	3	77	14	2	84
People should be able to use their preferred heating source	35	4	61	59	3	38
Wood heaters should be phased out (e.g. a subsidy or rebate scheme)	40	5	55	25	4	71
Wood heaters should be banned	39	7	54	31	4	65
Governments should regulate wood heater use	41	9	50	28	6	66
People using wood heaters should inform neighbours prior to use	39	13	48	35	9	56
There should be community education about how to correctly use and reduce smoke from wood heaters	57	6	37	42	8	50

These wood fire heaters don't have a place in a city where people live in close proximity, just a cluster of a few homes with one can have a large impact on a lot of people in the neighbouring area. I used to live in Kenthurst and every winter people in the area would be affected and complain about the smoke to the local council.

Macquarie Park (Sydney), NSW

I don't know why they haven't totally banned [wood heaters] in residential areas in major cities and large towns, my mother lives in Tamworth and when I was there in July, the smoke from the wood heaters was so bad; luckily I don't have asthma but it still made me unwell with a headache and sore throat.

Speers Point (Newcastle), NSW

RECOMMENDATIONS

Asthma Australia recommends all levels of government take action to reduce air pollution from wood heaters and the associated health impacts caused by exposure to wood heater smoke. We support phasing out wood heaters in residential areas where smoke can cause localised air pollution. We recommend federal, state, territory and local governments take the following actions to reduce the number of wood heaters in residential areas and support a transition to healthier, more efficient forms of heating homes.

RECOMMENDATION 1: Prohibit installation of wood heaters in homes in residential areas.

RECOMMENDATION 2: Require wood heaters to be removed on sale of homes in residential areas.

RECOMMENDATION 3: Provide financial support to low-income households to cover the costs of:

a) **Replacing inefficient and polluting forms of heating, including wood and gas heaters, with efficient, electric heating;**
b) **Undertaking home improvements to reduce the need for heating such as improving insulation and sealing draughts; and**
c) **Installing or connecting to renewable energy sources.**

RECOMMENDATION 4: While efforts are underway to phase out wood heaters (Recommendations 1,2,3), strengthen standards for wood heater emissions testing to reflect 'real life' wood heater operation and meaningfully reduce the emissions limit.

RECOMMENDATION 5: Require point of sale labelling on wood heaters that warn potential buyers about the health and safety risks of wood heaters.

RECOMMENDATION 6: Local governments enforce environmental regulations by investigating complaints of excessive wood heater smoke and issuing infringement notices when needed.

RECOMMENDATION 7: While efforts are underway to phase out wood heaters in residential areas (Recommendations 1,2,3), state, territory and local governments implement programs to educate people about the adverse health impacts of wood heater smoke.

RECOMMENDATION 8: Commonwealth, state and territory governments fund the implementation of an AirSmart public education campaign to minimise the health impacts of air pollution, including from wood heaters.

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