



HOMES, HEALTH AND ASTHMA IN AUSTRALIA

Understanding who is at risk of asthma or allergies
in their home, what actions people take to protect
themselves, and the barriers to action



**ASTHMA
AUSTRALIA**



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EXECUTIVE SUMMARY

Introduction

Housing is recognised as an important social determinant of health as it can impact a person's health and wellbeing either positively or negatively. There are many features of a home which can influence health and wellbeing, including the physical structures and its ability to provide shelter, access to fuel and electricity, sufficient space and protection from pollutants, hazards, mould, and pests; as well as the sense of belonging, security and privacy provided by the home.¹

The home environment is particularly important for people with asthma and allergies, who are sensitive to certain substances we all breathe. These substances are referred to as 'triggers' because they can trigger asthma or allergy symptoms. A number of triggers can be found in Australian homes, some of which can also increase the risk of a person who doesn't have asthma developing the condition.

This report focuses on:

- **Indoor air pollution from heating with gas or wood heaters:** These heaters produce a range of pollutants and can worsen indoor air quality. Exposure to these pollutants can trigger asthma flare-ups and contribute to the development of asthma.
- **Indoor air pollution from cooking:** Cooking food can reduce air quality in the home as a result of emissions from gas cooktops and emissions from frying, grilling, baking or toasting food. Exposure to these pollutants can trigger asthma flare-ups and contribute to the development of asthma.
- **Mould and dampness:** No amount of mould is considered safe for health. Exposure to mould can lead to asthma flare-ups and a range of other health problems.
- **Pests:** Ants, spiders, mice, cockroaches and dust mites are sources of allergens that can cause allergic reactions and trigger asthma.

Despite the known health implications, there is a lack of evidence about how many Australians are exposed to these triggers in their homes, the actions people take to address triggers and barriers that prevent people taking action.

Survey

Asthma Australia undertook this survey to understand:

- What asthma triggers people in Australia are exposed to in their homes,
- Whether people take action to reduce the presence of asthma triggers in their homes or their exposure to them, and
- What barriers may prevent people from taking action to address triggers or reduce their exposure to them.

The survey was completed by a nationally representative sample of 5,041 people between the 17th and 30th of June 2022.

Overview of key findings

1 Homes are not healthy places for all Australians, particularly people with asthma or allergies.

While homes should be places that improve our health and wellbeing, **one quarter of Australians (24%) are not happy or are unsure about the air quality inside their homes.** Among people with asthma and allergies, three in ten reported that their symptoms are worse after spending time in the home.

2 Many Australians are exposed to asthma triggers in their home including emissions from gas appliances, mould and pests such as dust mites.

- 50% of Australians have had mould or dampness in their home in the last 12 months, with one third (34%) reporting mould.
- 48% of Australians use a gas cooktop.
- 7% of Australians use unflued gas heating.
- 70% of Australians have had pests (including spiders, ants, cockroaches, dust mites and mice) in their home in the last 12 months.
- 13% of Australians use wood heating.

3 Groups more likely to report exposure to pests, mould, and emissions from unflued gas heating include Aboriginal and Torres Strait Islander people, people with asthma and allergies, people with children in the home and (for mould and pests) people living in social housing.

Exposure to these triggers was more common among certain priority populations and those more vulnerable to the impacts of exposure to these triggers.

Aboriginal and Torres Strait Islander people were	6.5 times more likely to report dampness 2.3 times more likely to report mould 1.5 times more likely to report unflued gas heating 2 times more likely to report pests
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People living in social housing were	2 times more likely to report mould and dampness 1.7 times more likely to report pests
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People with asthma were	1.4 times more likely to report mould and dampness 1.2 times more likely to report unflued gas heating 1.5 times more likely to report pests
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People with children in the home were	1.7 times more likely to report dampness 1.6 times more likely to report mould 1.4 times more likely to report pests 1.4 times more likely to report gas cooktops
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4 People with children in their household were more likely to report using gas cooktops.

People living with children in the home were 1.4 times more likely to report using gas cooktops compared to people without children in the home. Cooking with gas is estimated to be responsible for up to 12% of the childhood asthma burden in Australia which is comparable to the risk of tobacco smoke exposure in the home.²

5 People who own their home or live in higher income households are more likely to report using wood heating or gas cooktops.

People in higher income households were twice as likely to report gas cooktops and 1.5 times more likely to report having wood heating than lower income households. This trend was also reflected in homeowners, compared to those renting or living in social housing. This association indicates a need for greater awareness of the health and environmental impacts of gas cooktops and gas and wood heaters to encourage people in higher socioeconomic brackets to change to healthier forms of household heating and cooking. However, there is also a need for subsidy schemes to support low-income households to transition to healthier forms of heating and cooking.

6 Australians prefer to use gas cooktops, despite the adverse health and environmental impacts.

Gas cooktops are the preferred cooktops for many Australians (45%). However, regardless of their cooktop preference, most Australians are making this choice based on cooking preferences, ease of cleaning and affordability. Only 15% of respondents cited their cooktop preference was due to health reasons and 14% noted environmental reasons. These findings suggest a need for greater awareness of the health and environmental implications of gas emissions in the home.

7 Many Australians would prefer to use efficient heating systems but are restricted by cost and having limited autonomy to make changes in their homes.

Half of Australians (47%) would prefer to have reverse cycle air conditioning or central heating systems, which are considered more efficient. However, among the 43% who do not currently have their preferred form of heating, many face barriers to switching. Nearly half reported they are unable to change due to the cost of replacing their heating system and one third are unable to because they do not own their home.

8 Nearly all Australians are taking regular action to reduce, prevent or avoid exposure to mould in their homes, particularly those who are more likely to report the presence of mould.

Nearly all Australians (89%) are taking regular action to reduce, prevent or avoid exposure to mould. Population groups who were more likely to report the presence of mould were also more likely to report taking regular actions. This includes people living in social housing, Aboriginal and Torres Strait Islander people, people with asthma and allergies, and people with children in the home. It is also worth noting this survey was conducted during heavy rainfall events, particularly in New South Wales and Queensland, which may have led to higher awareness and action.

9 Most Australians are taking regular action to remove, prevent or reduce pests in the home, particularly those who are more likely to report the presence of pests.

Most Australians (71%) reported taking at least one action to remove, prevent or reduce pests in the last 12 months. Population groups who were more likely to report the presence of pests were also more likely to report taking regular actions. This includes people living in social housing, Aboriginal and Torres Strait Islander people, people with asthma and allergies, and people with children in the home.

10**Many Australians face barriers to making changes to improve their indoor air quality.**

Only 6 out of 10 Australians said they were confident to make changes to improve the air quality inside their home. Common barriers to take actions across triggers included:

a. Cost

One quarter of Australians said it is too expensive to purchase or use equipment, like air purifiers, to take action while cooking, or to take action against mould and pests. Among those who did not have their preferred heating or cooktop type, 47% said the cost of replacing it was a barrier. Some participants described the additional pressure of living on low incomes and the cost-of-living crisis.

"I have budget limitations to install some items that would help (e.g. a fan in the bathroom and exhaust for rangehood). **I would like to buy an air purifier** but again have no budget with rising interest rates and cost of living."

b. Lack of autonomy over property

Half of people who rent or live in social housing reported they were unable to make changes to protect themselves from emissions while cooking, or take action against mould and pests because they do not own their home. Additionally, three quarters of people renting or living in social housing said not owning their home is stopping them from switching to their preferred heating or cooktop. People described frustration with a lack of action by their landlord or social housing provider and concern about requesting changes in case of rent increases or eviction.

"I live in a rental, and they are terrible at doing any sort of maintenance, and so **I feel like they would penalise me if I mentioned potential mould.**"

c. Lack of concern or knowledge

Two-fifths (38%) of people said they were not worried or concerned about taking action to address at least one of the triggers covered by this survey. This was highest for taking action while cooking (23%). Additionally, one fifth (18%) reported they do not know what to do to protect themselves against at least one of the triggers. This was highest for mould (12%).

"I googled for help for mould but **the advice is mixed** and doesn't seem thorough. Most of the advice is temporary light touch things like using vinegar. But the mould keeps coming back. There are lot of businesses but they don't seem to have a licensing scheme so **I have no idea who to trust** and who is just selling snake oil."

11**Certain population groups are more likely to report barriers to taking action to reduce exposure to emissions, mould and pests.**

Population groups more likely to report barriers to taking action included renters and people living in social housing, people living in lower income households, Aboriginal and Torres Strait Islander people, people with asthma and allergies, younger people and people with higher education levels.

Low-income households, renters and people living in social housing face systemic and structural barriers that prevent them from taking action. Additionally, most of these population groups were also most likely to report having triggers in their home. Given the greater prevalence, they may be more conscious of reducing the triggers or their exposure, and therefore more likely to be aware of barriers which prohibit them from acting.

12 People who own their home and people without asthma are less likely to be worried about exposure to pests, mould and emissions from cooking.

People who own their home were less likely to report being concerned or worried about taking action while cooking, or against mould and pests. Similarly, people without asthma less likely to report being concerned or worried about taking action while cooking or against mould.

Overview of policy implications



Financial support for **low-income households** seeking to improve home health, focusing on priority populations



Education programs to improve understanding in the general population and priority populations around home health



Incentives for landlords to improve the health of **private rental homes**



Investment in improving the health of existing **social housing** stock



Improving standards for **new homes**

This research reveals the need for a range of policy measures to improve the health of Australian homes. Asthma Australia has identified these key areas for reform and seeks to engage with stakeholders to identify and advocate for specific policy asks.

Beyond these key areas for policy reform, Asthma Australia recognises that homes are a critical consideration in addressing the climate crisis. Australian homes both contribute to greenhouse gas emissions and serve as spaces where people can shelter during climate-driven events such as bushfires and floods.

This is particularly important for people vulnerable to triggers from these events and triggers inside homes, including people with asthma and allergies. Australian homes not only present an opportunity for emissions reduction but also a priority for climate adaptation action.

For the full policy implications, see page 51.

INTRODUCTION

Background

Housing is recognised as an important social determinant of health as it can impact a person's health and wellbeing either positively or negatively. There are many features of a home which can impact health and wellbeing, including the physical structures of the home and its ability to provide shelter, access to fuel and electricity, sufficient space and protection from pollutants, hazards, mould, and pests; as well as the sense of belonging, security and privacy provided by the home.³

Housing and asthma

Asthma is an inflammatory condition of the airways, which restricts airflow and can be fatal. It affects 1 in 9 Australians, or 2.7 million people. The severity of asthma varies from mild to severe and the condition affects people of all ages. While there is no cure for asthma, most people with asthma can experience good control of their condition.

People with asthma have airways that are sensitive to substances we all breathe, which are referred to as 'triggers' because they can trigger asthma symptoms. Similarly, people with allergies experience symptoms in response to certain triggers. Asthma flare ups occur when symptoms increase or worsen, can lead to hospitalisation and can be life-threatening. Some triggers also increase the risk of a person who doesn't have asthma developing the condition.

Asthma control is typically achieved through a combination of adherence to medication under a healthcare professional's guidance and management of exposure to asthma triggers. Regular use of a preventer medication, as prescribed, is the most important action for people with asthma to take because it treats the underlying cause of symptoms and reduces vulnerability to triggers.

Despite the known health implications of triggers in the home, there is a lack of evidence about how many Australians are exposed to these triggers in their homes, the actions people take to address triggers and barriers that prevent people taking action.

This research focuses on the following triggers which can be found in homes around Australia:

- **Indoor air pollution from heating with gas or wood heaters**

Heating a home with gas or wood heaters can reduce indoor air quality. The combustion of gas produces a variety of air pollutants including fine particulate matter, nitrogen dioxide, carbon monoxide, and formaldehyde. Unflued gas heaters are particularly dangerous because the pollutants remain inside the home rather than being vented outside. Burning wood in wood heaters produces a range of pollutants including fine particulate matter. Exposure to these pollutants can trigger asthma flare-ups and contribute to the development of asthma.^{4,5}

- **Indoor air pollution from cooking**

Cooking food can reduce air quality in the home as a result of emissions from gas cooktops and emissions produced by frying, grilling, baking or toasting food.⁶ As with gas heaters, the combustion of gas during cooking produces a variety of air pollutants. Exposure to these pollutants can trigger asthma flare-ups and contribute to the development of asthma. Cooking with gas is estimated to be responsible for up to 12% of the childhood asthma burden in Australia.⁷

- **Mould and dampness**

Mould is common in damp places like showers, sinks and near leaky pipes. It can also grow in poorly ventilated and maintained homes. Dampness is associated with mould. No amount of mould is considered safe for health, as it produces millions of airborne spores that can be inhaled.⁸ Breathing in mould can irritate the airways and trigger an allergic response. Both these reactions can lead to an asthma flare-up and a range of other health problems.

- **Pests**

Ants, spiders, mice and cockroaches are sources of allergens that can cause allergic reactions and trigger asthma flare-ups.⁹ These reactions can be caused by the proteins found in the flakes of skin or dander, saliva or urine of pests. Dust mites, tiny insects which live in household dust, are a common trigger for asthma. Dust mites can also trigger allergy symptoms, and are associated with an increased risk of asthma in childhood.^{10,11}

Addressing asthma triggers in the home is an important focus for improving asthma outcomes because a range of interventions can reduce exposure to these triggers.

Aim

Asthma Australia undertook this survey to better understand the exposure to particular asthma triggers in the home among the general Australian population. The results of this survey will help Asthma Australia to provide relevant information to people with and without asthma about asthma triggers in the home, and to influence policy to improve health outcomes.

This survey aimed to understand:

- What asthma triggers people in Australia are exposed to in their homes,
- Whether people take action to reduce the presence of asthma triggers in their homes or their exposure to them, and
- What barriers prevent people from taking action to address triggers or reduce their exposure to them.

Methodology

The survey questionnaire was designed by a Griffith University Master of Public Health student in collaboration with Asthma Australia staff. It was reviewed by Asthma Australia staff, Asthma Australia's Professional and Consumer Advisory Council, and experts in air quality and housing.

The survey was primarily quantitative. It asked questions about respondents' perception of air quality inside their home, exposure to particular asthma triggers in the homes, actions they may take to reduce the presence of triggers or their exposure to the triggers, and what barriers they face that prevent them from taking action. The survey also asked for general demographic information about the respondents and details about their housing situation. The survey included one open ended question for participants to detail specific or regular challenges they may face to reduce their exposure to the asthma triggers asked about in the survey.

The survey was disseminated using an online panel service, Dynata. Responses were collected between the 17th and 30th of June 2022. An online platform, Qualtrics, was used to capture survey responses.

The survey was open for people over the age of 18 and living in Australia to complete. Respondent quotas were in place to reach a nationally representative sample by state/territory, age, gender and regionality based on Australian Bureau of Statistics Census, National Health Survey and state and territory population data. Respondent annual household income, education level and housing tenure were closely monitored. Quotas were not placed on the number of respondents from social housing, to allow for a larger sample for analysis.

Descriptive data analysis and cross tabulation was completed by the Asthma Australia team using the Qualtrics platform. Logistic regression models were estimated by a member of the University of Melbourne's Healthy Housing Centre of Research Excellence.

Asthma Australia would like to thank the respondents who completed this survey, as well as the people who contributed to the survey design, including Associate Professor Shannon Rutherford. We would also like to thank Professor Rebecca Bentley, Yuxi Li and Adelle Mansour for their contribution to the analysis.

RESULTS

Survey Respondents

The survey was completed by a nationally representative sample of 5,041 people.

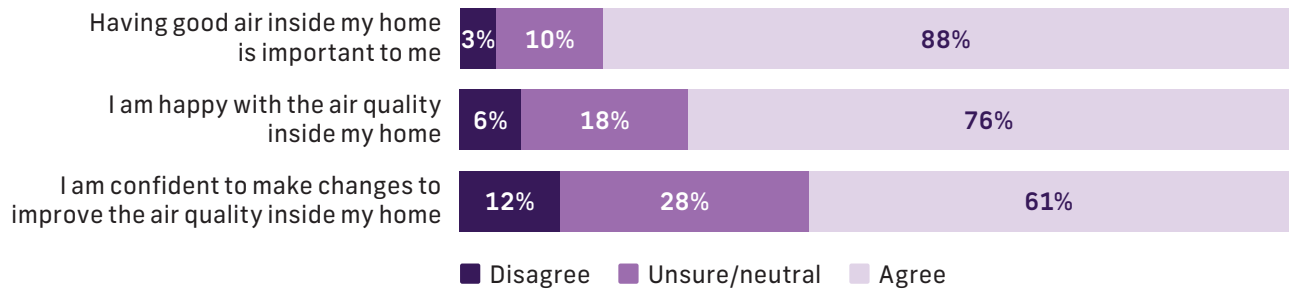
Location	ACT 2% NSW 30% NT 1% QLD 21% SA 7% TAS 2% VIC 27% WA 10%	Major cities 75% Regional/remote 25%
Gender	52% female 48% male 1% non-binary/other	
Housing	58% own their home 19% are renters (renting privately from a real estate agent) 9% live in social housing (renting from a government housing authority, housing department or community housing provider) 14% live in other housing types (e.g. living with parents or renting a room in a home)	
Asthma	21% have been diagnosed with asthma	
Allergies	27% have been diagnosed with allergies or hay fever	
Aboriginal and/or Torres Strait Islander	5%	
Age	18–24 10% 25–34 17% 35–44 18% 45–54 17% 55–64 17% 65–74 14% 75+ 8%	
Highest level of education	Year 12 or below 30% Certificate or diploma 33% Bachelor's degree or above 37%	
Annual household income	Less than \$40,000 a year 25% \$40,000–\$80,000 a year 29% \$80,000–\$120,000 a year 18% \$120,000–\$150,000 a year 11% More than \$150,000 a year 11% Don't know or prefer not to say 6%	

Perception of air quality in the home

Nearly all respondents (88%) agreed that having good air inside the home is important to them, and most (76%) agreed they are happy with the air quality inside their home.

However, one quarter of respondents (24%) are either not happy or are unsure about the air quality inside their home. Additionally, two-fifths (40%) are not confident or are unsure about making changes to improve the air quality inside their home.

Figure 1: Perception of air quality in the home



13% of people living in social housing and 9% of renters said they were not happy with the air quality inside their home, compared to 4% of homeowners. Similarly, 16% of people living in social housing and 17% of renters said they are not confident to make changes to improve the air quality inside their home, compared to 9% of homeowners



There is an increasing trend in happiness with indoor air quality and confidence to make changes by increasing income

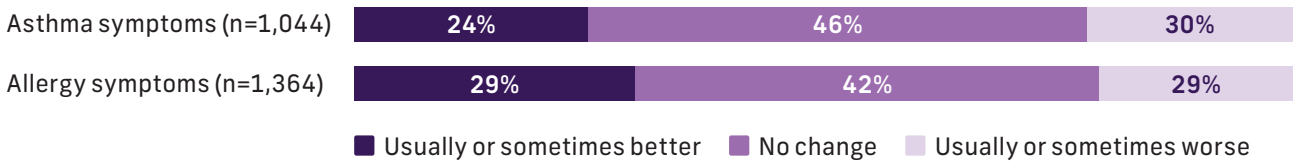


70% of people with asthma are happy with the air quality inside their home, compared to 77% of people without asthma

Impacts of air quality in the home

Almost one third of respondents with asthma (30%), and a similar proportion of people with allergies (29%), reported their symptoms were usually or sometimes worse after spending time inside the home.

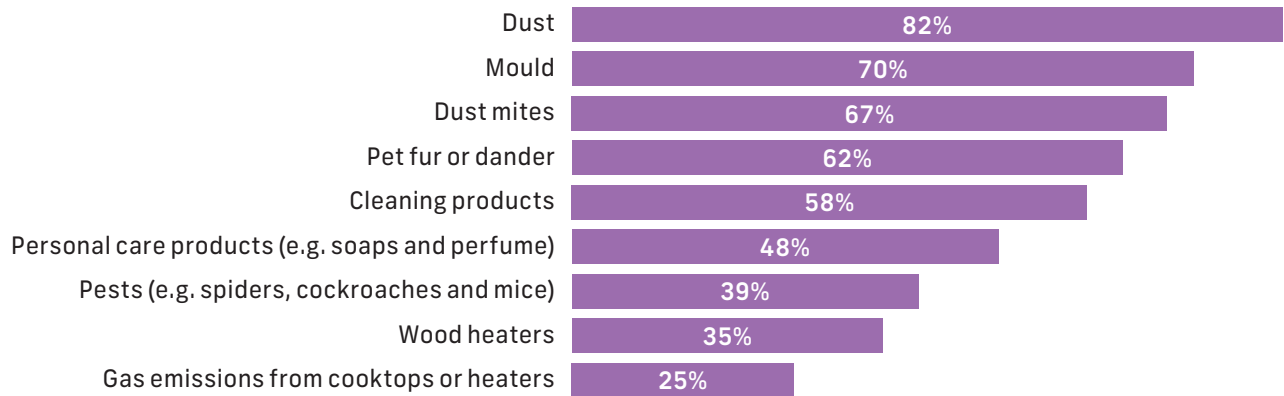
Figure 2: Changes to asthma and allergy symptoms after spending time inside the home



Awareness of asthma or allergy triggers

Most respondents were aware that dust (82%), mould (70%) and dust mites (67%) can make asthma or allergies worse. There was a much lower awareness that gas emissions from cooktops or heaters can be a trigger for asthma (25%).

Figure 3: Percentage of people who agree specified triggers can make conditions like asthma or allergies worse



Gas and wood heating emissions

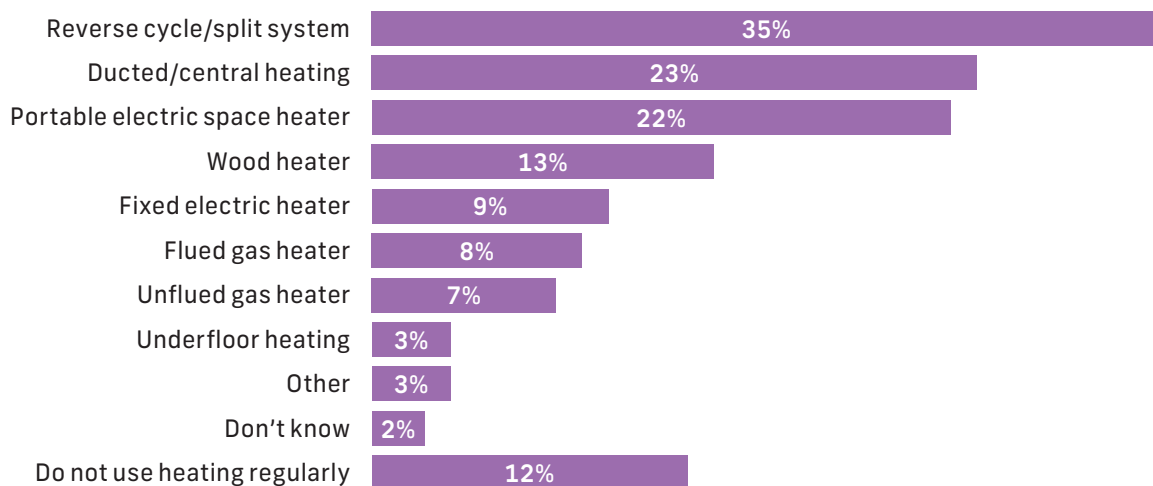
Heating a home with gas or wood heaters can reduce indoor air quality.

Gas heaters produce a variety of air pollutants when gas is burned including fine particulate matter, nitrogen dioxide, carbon monoxide, and formaldehyde. Unflued gas heaters are particularly dangerous because these pollutants remain inside the home rather than being vented outside. Wood heaters also produce a range of pollutants, including fine particulate matter.

Exposure to the pollutants produced by wood and gas heaters can trigger asthma flare-ups and contribute to the development of asthma.

Most respondents (88%) use heating in their homes regularly during cooler months. The most common heating options were reverse cycle/split systems (35%), ducted or central heating (23%), and portable electric space heaters (22%).

Figure 4: Types of heating used regularly during cooler months



Prevalence of wood heaters

13% of respondents reported they use a wood heater as a regular source of heating; this includes both open fireplaces and combustion/wood burning heaters.

Who was more likely to report using wood heating?



People in Tasmania were **more than twice as likely** to report using a wood heater compared to other states and territories. Almost one third of Tasmanians (30%) reported they use a wood heater regularly, compared to the next highest usage in the ACT (15%).



People in major cities were **60% less likely** to use wood heaters than people in regional or remote areas.



People with a bachelor's degree or above were **1.6 times more likely** to report wood heater usage than people whose highest level of education was year 12 or below.



People who own their home **were almost twice as likely** to use a wood heater than renters or people living in social housing.



People with a household income of \$120,000–\$150,000 were **1.5 times more likely** to report wood heater usage than people with a household income of less than \$40,000.

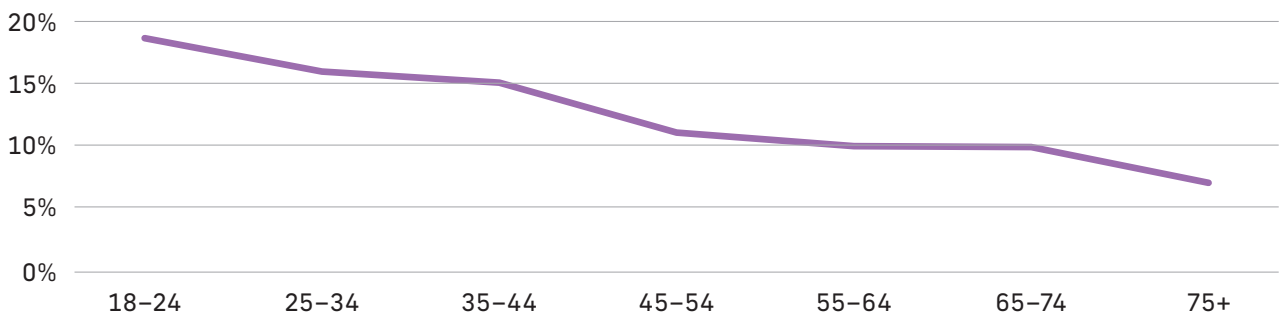


Aboriginal and Torres Strait Islander people were **more than twice as likely** to have a wood heater than non-Aboriginal or Torres Strait Islander people.



There was a **decreasing use of wood heaters reported by age** (see figure 5). People aged 75 and older were **70% less likely** to use a wood heater than people aged 18–25.

Figure 5: Prevalence of wood heater use by age



Prevalence of unflued gas heaters

8% of respondents reported they regularly use **flued gas** heating at home, and 7% of respondents reported they regularly use **unflued gas** heating at home.

Who was more likely to report using unflued gas heating?



Aboriginal and Torres Strait Islander people were **1.5 times more likely** to report use of unflued gas heating than non-Aboriginal or Torres Strait Islander people.



People who live in major cities were **1.3 times more likely** to report use of unflued gas heating than people in regional or remote areas.



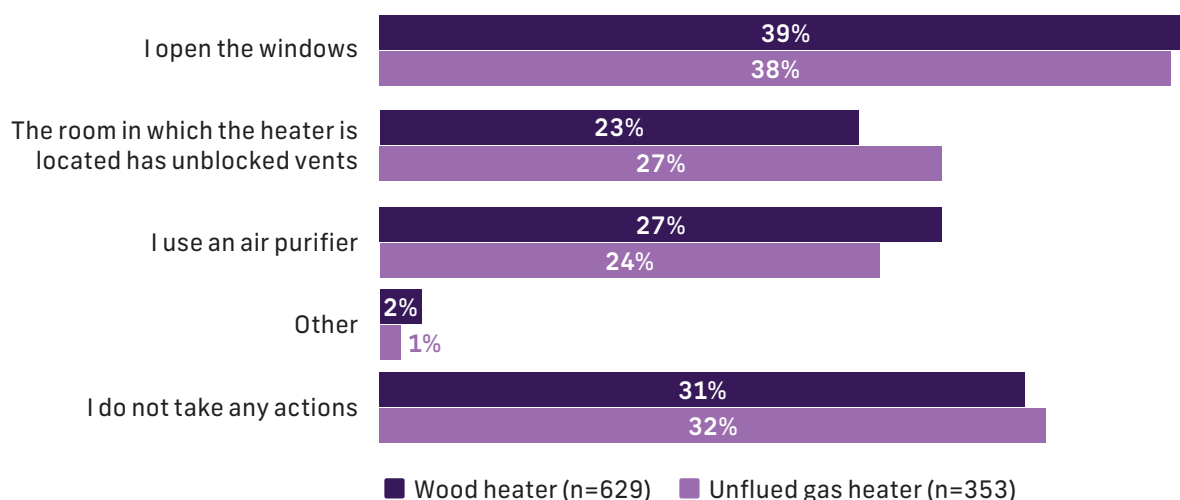
People with asthma and allergies **were slightly more likely** to report use of unflued gas heating than people without asthma or allergies (1.2 and 1.3 times respectively).

Actions taken when using wood or unflued gas heating in the home

A number of actions can improve indoor air quality while heating sources, such as unflued gas heaters and wood heaters, are in use. The survey asked participants who reported use of these heating sources about the actions they regularly take while using them.

Among people who reported regular use of a wood or unflued gas heater, 68% reported taking some type of action while using them, with the most common being opening windows while using the heater. Two fifths (39%) of wood heater users and a similar proportion (38%) of unflued gas heater users reported opening windows while using these types of heating. Only one quarter (27%) of unflued gas heater users reported having unblocked vents in the room where their heater is located, which reduces ventilation and dispersal of emissions.

Figure 6: Actions taken while using wood or unflued gas heating in the home



Who was more likely to take action while using wood or unflued gas heating?



People who live in social housing were **3.5 times more likely** to take action while using wood heating than those who own their home.



People with a bachelor's degree or above were **3 times more likely** to take action while using unflued gas heating and **3.6 times more likely** to take action while using wood heating compared to people whose highest level of education was year 12 or below.



People living in major cities were **1.7 times more likely** to take action while using unflued gas heating and **1.6 times more likely** to take action while using wood heating than people living in regional or remote areas.



Aboriginal and Torres Strait Islander people were **3 times more likely** to take action while using unflued gas heating and **2.5 times more likely** to take action while using wood heating than non-Aboriginal or Torres Strait Islander people.

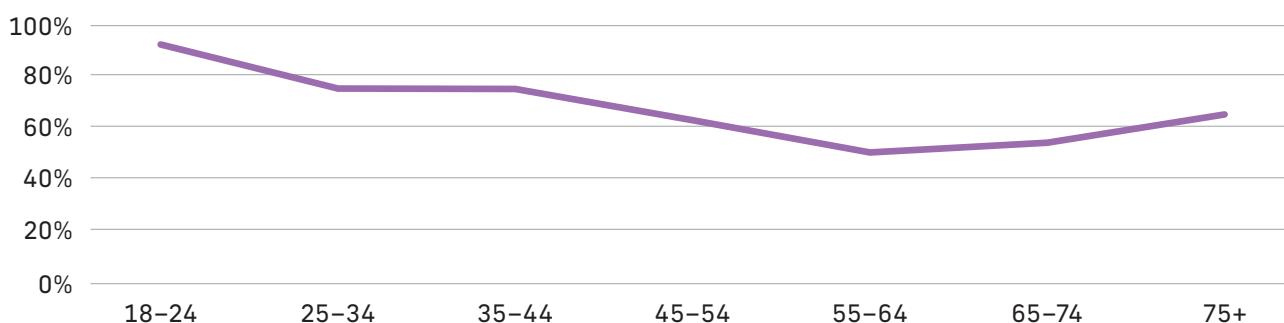


People with allergies were **1.9 times more likely** to take action while using unflued gas heating and **2.2 times more likely** to take action while using wood heating than people without allergies.



There was a generally **decreasing trend** in the percentage of people taking action while using unflued gas or wood heating by increasing age (see figure 7).

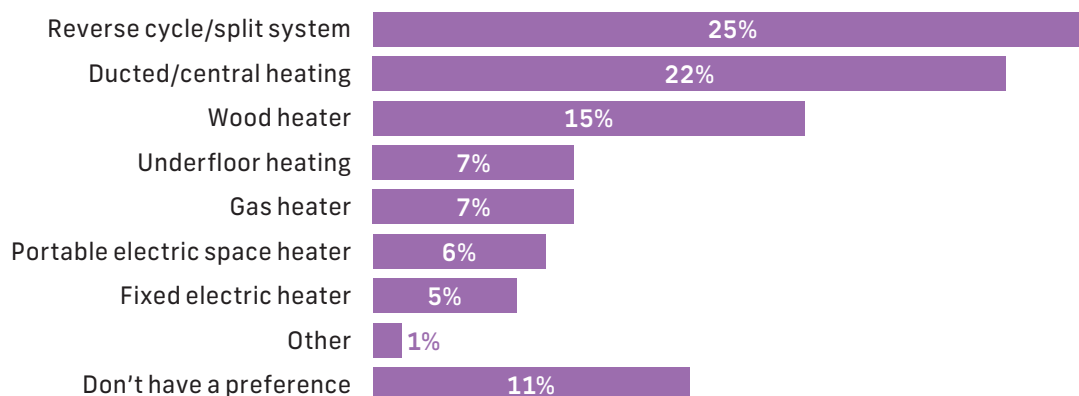
Figure 7: Percentage of people taking any action while using unflued gas or wood heating by age (n=923)



Preferred type of heating

For half of respondents (47%), reverse cycle/split system heating or ducted/central heating is the preferred type of heating in the home.

Figure 8: Preferred type of heating



Most respondents reported their preference was due to the effectiveness of the heating type (61%). This was more common among people whose heating preference was ducted/central heating (81%), compared to reverse cycle/split system heating (65%) and wood heaters (53%). People were twice as likely to report a preference for reverse cycle/split system heating or wood heaters because they considered them more affordable to purchase (15% and 17%), and use (40% and 42%) compared to those who preferred ducted/central heating, where only 7% considered the heating type to be more affordable to purchase and 19% more affordable to use. Only 22% of all respondents reported their preference was because the heating type was better for their health, and only 15% because it was better for the environment.

Figure 9: Reasons for heating preferences

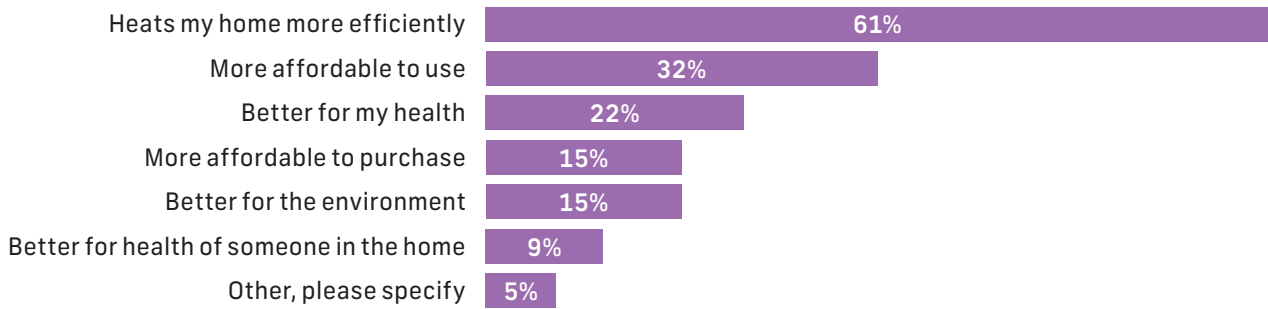
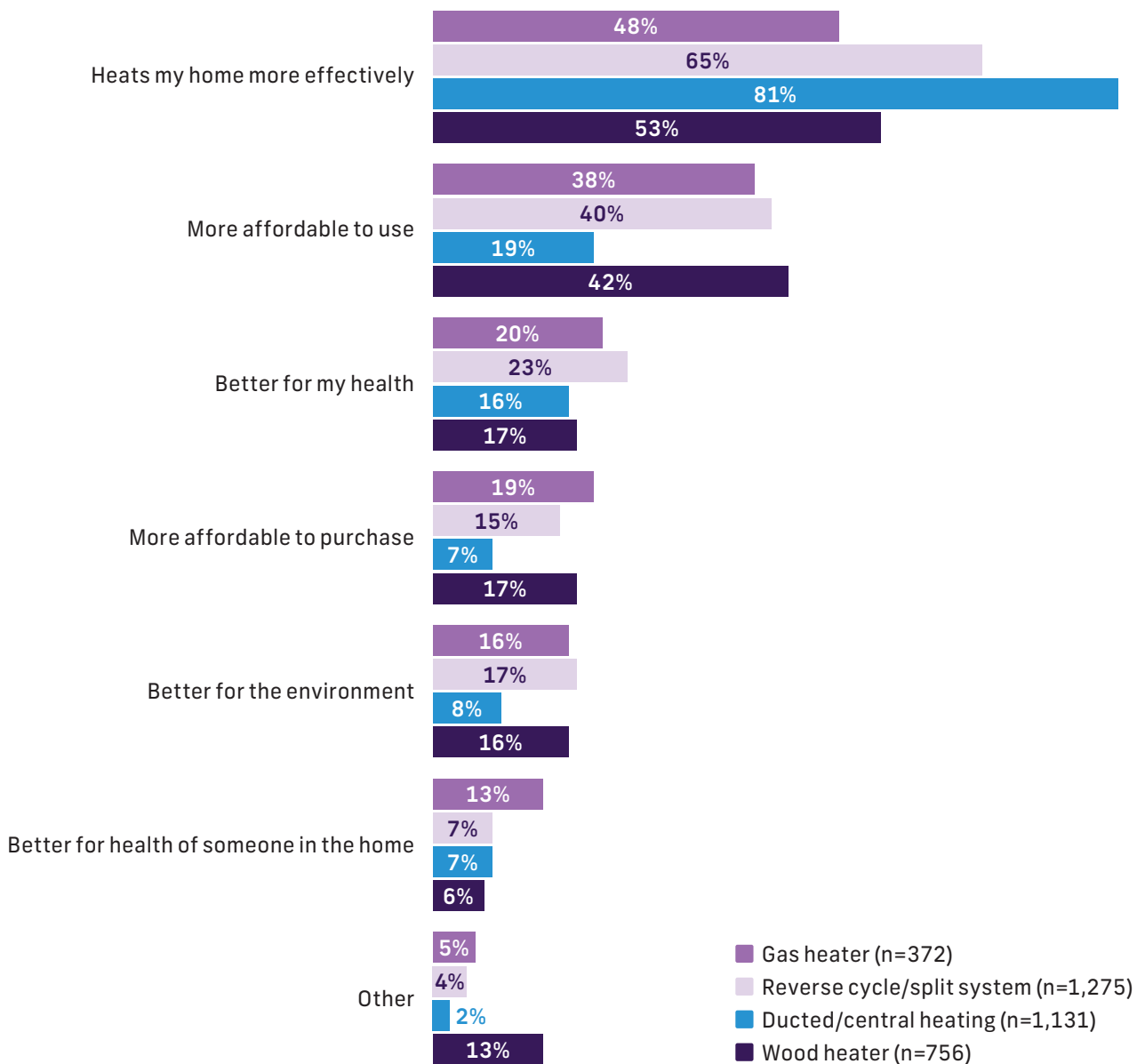


Figure 10: Reasons for preferred heating by heating preference

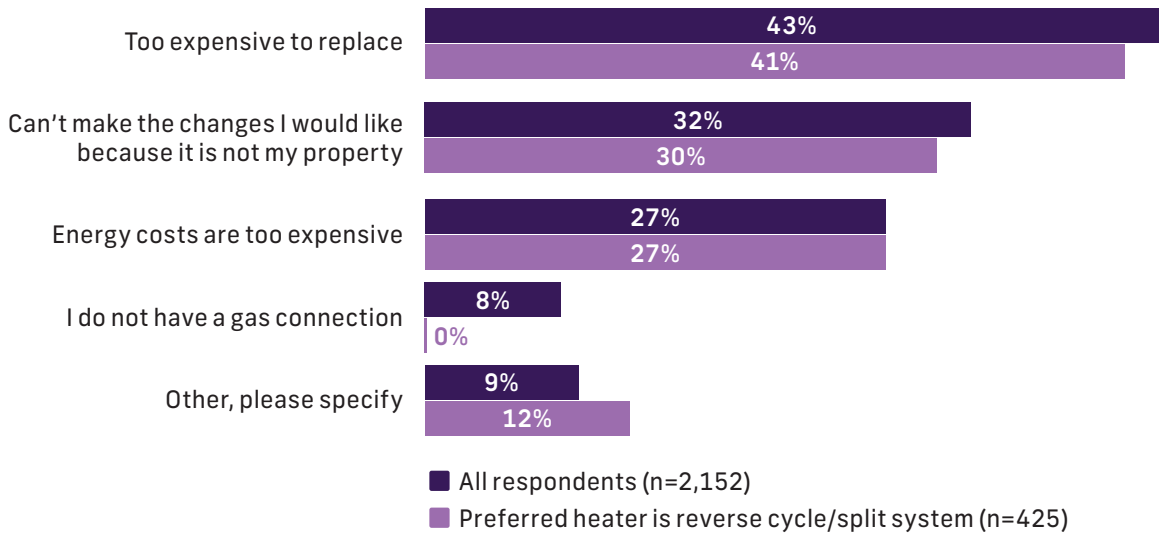


Barriers to switching heaters

Nearly half (43%) of respondents reported they do not currently have their preferred form of heating at home. For these respondents, the most common barrier to switching was the cost of replacing their heating system (43%), followed by not being able to make the changes they would like to due to not owning the property (32%). Energy costs were also a significant barrier, deterring over one quarter of respondents (27%).

These results were similar for those who prefer, but do not currently have, reverse cycle/split system heating.

Figure 11: Barriers to switching to preferred form of heating



Cooking emissions

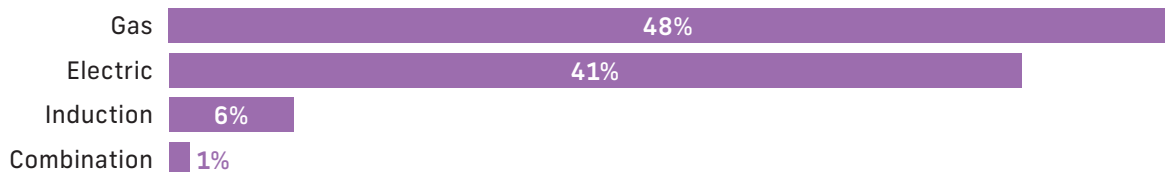
Cooking food can reduce air quality in the home as a result of emissions from gas cooktops and emissions produced by frying, grilling, baking or toasting food.¹² The combustion of gas during cooking produces a variety of air pollutants including fine particulate matter, nitrogen dioxide, carbon monoxide, and formaldehyde.

Exposure to these pollutants can trigger asthma flare-ups and contribute to the development of asthma. Cooking with gas is estimated to be responsible for up to 12% of the childhood asthma burden in Australia.¹³

Prevalence of gas cooktops

The most common type of cooktop is gas (48%), followed by electric (41%). Just 7% had an induction cooktop or a combination cooktop.

Figure 12: Types of cooktops used at home



Who was more likely to report using gas cooktops?



Households with higher incomes are more likely to report gas cooktops in their homes. People with household incomes above \$120,000 were **twice as likely** to report having a gas cooktop in their home compared to people with household incomes below \$40,000.



People in major cities were **twice as likely** to report having a gas cooktop as people in regional or remote areas.



People who rent or live in social housing were **less likely** to report having a gas cooktop than homeowners (30% and 40% less likely respectively).



Aboriginal and Torres Strait Islander people were **40% less likely** to report having a gas cooktop than non-Aboriginal or Torres Strait Islander people.

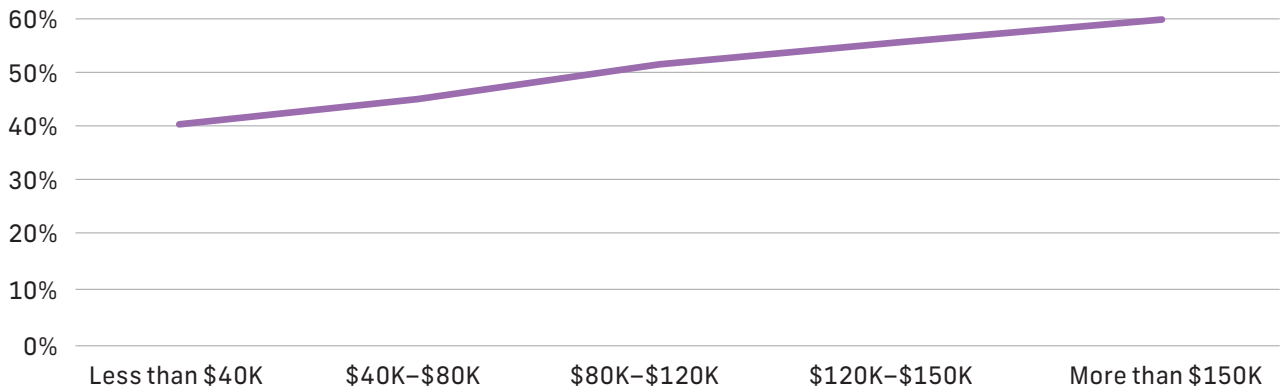


People with a bachelor's degree or above were **1.3 times more likely** to report having a gas cooktop than those whose highest level of education was year 12 or below.



People with children in their household were **1.4 times more likely** to have a gas cooktop compared to people without children in their home.

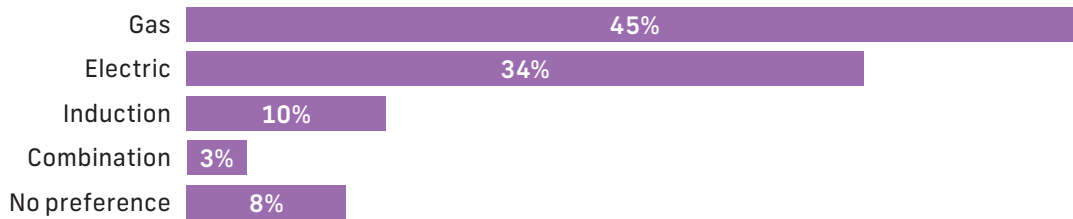
Figure 13: Prevalence of gas cooktops by income



Preferred type of cooktop

Gas cooktops were the preferred type of cooktops for the most respondents (45%), followed by electric (34%) and induction (10%).

Figure 14: Preferred cooktop type among all respondents



Most people who preferred to have a gas cooktop said this was because they like cooking on that type of cooktop (71%), compared to only half of participants who reported this for electric (46%) and induction (45%) cooktops. In contrast, people were more likely to prefer induction (55%) or electric (42%) cooktops because they are easier to clean, compared with gas cooktops (17%).

More than one third (36%) of people who preferred an induction cooktop reported this was because it is better for the environment, compared to only 16% of people who prefer electric and 9% of people who prefer gas cooktops.

Overall, only 15% of respondents said their preference was because the cooktop type was better for their health. This was higher for people who preferred electric (24%) and induction (16%), and lower for those who preferred gas (9%).

Figure 15: Reasons for preferred cooktop type

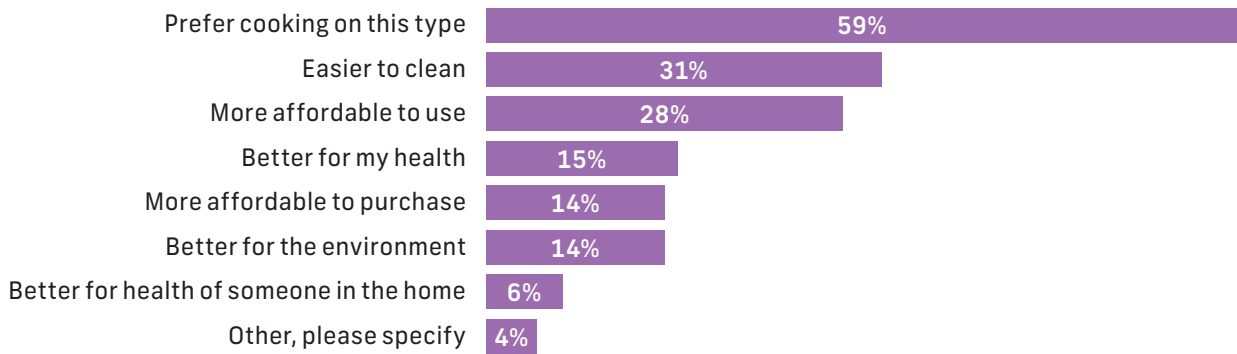
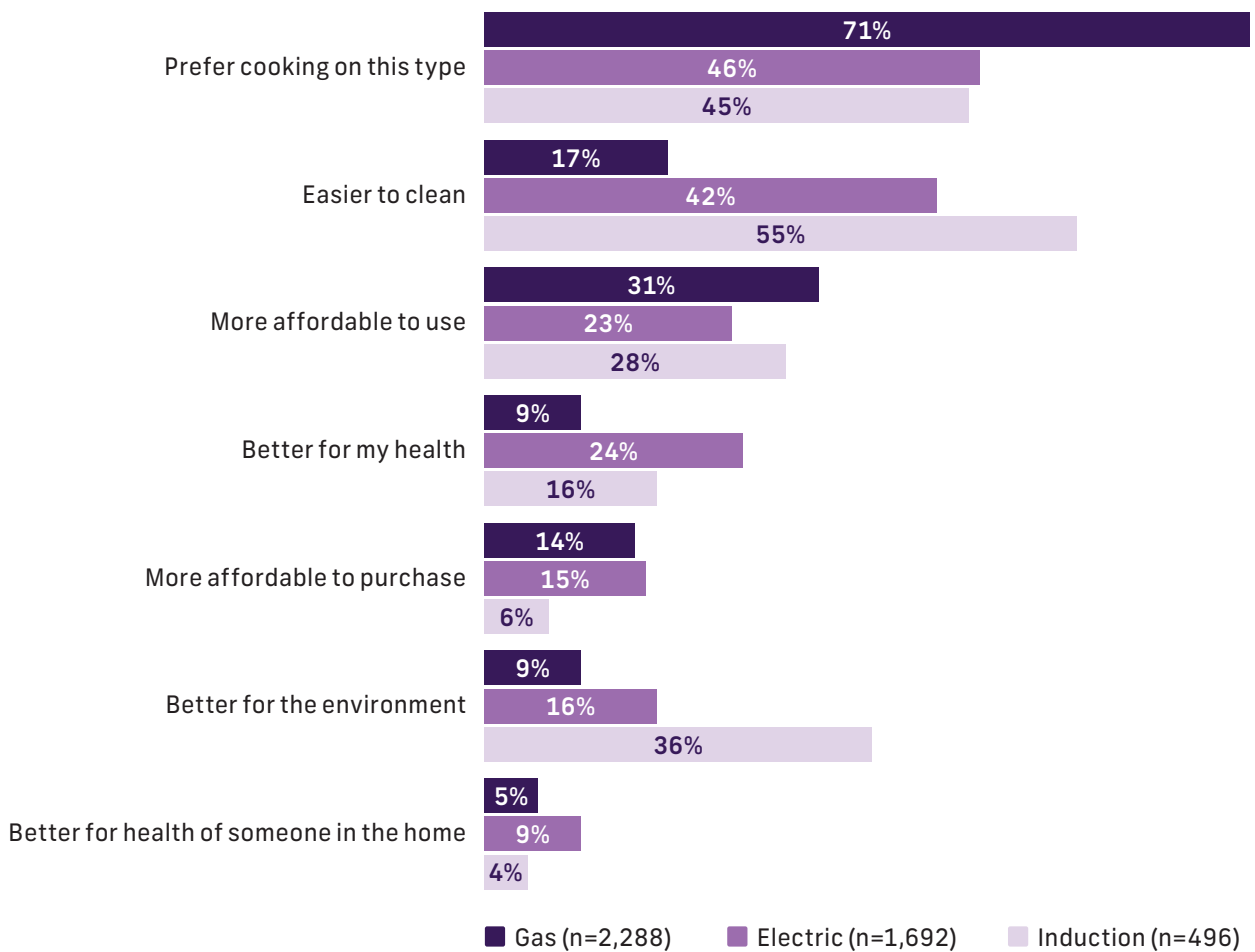


Figure 16: Reasons for cooktop preference by cooktop type

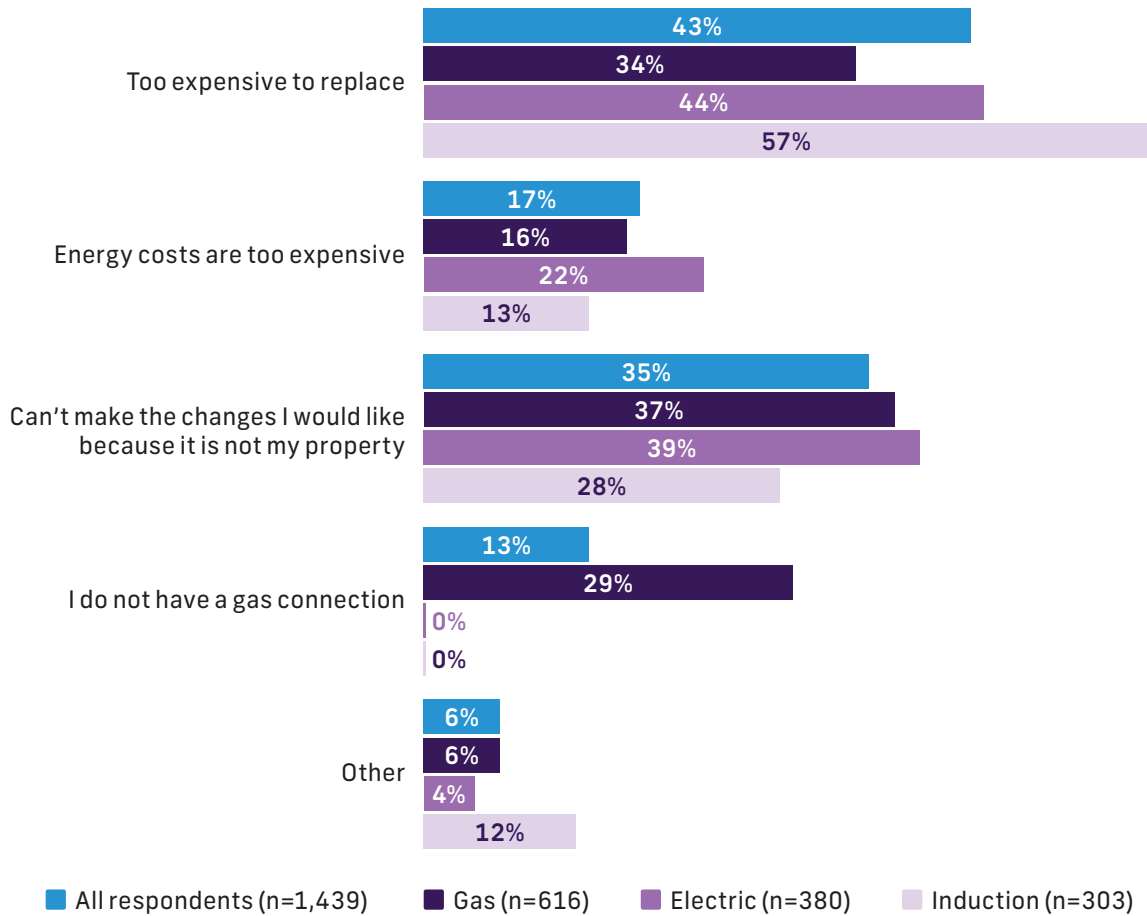


Barriers to switching cooktops

One third of respondents (29%) reported they do not currently have their preferred type of cooktop.

Of these respondents, the most common barrier to changing their cooktop was the cost of replacement (43%). This was higher for those whose preferred cooktop was induction (57%). One third of respondents (35%) said they cannot switch to their preferred cooktop because they don't own their home.

Figure 17: Barriers to switching to preferred cooktop by cooktop preference



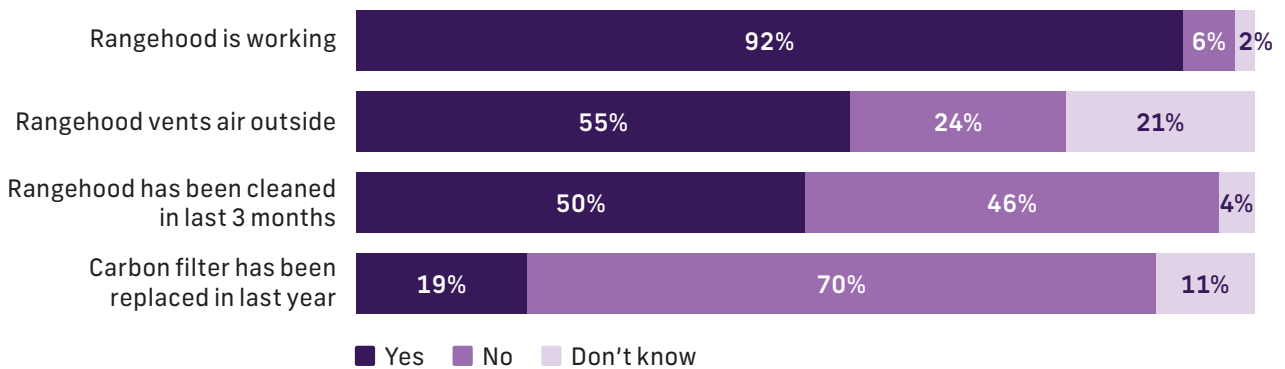
Rangehoods

Using rangehoods while cooking can remove pollution caused by cooking processes or gas combustion as well as removing cooking smells and steam. Rangehoods with vents to the outside are more effective than rangehoods which filter and recirculate air. Rangehoods should be cleaned regularly while rangehoods which rely on filters need to have their filters replaced.

Most respondents (82%) have a rangehood above their cooktop. Of the respondents with a rangehood, 92% reported their rangehood is working. However, only half of respondents have a rangehood which vents the air outside (55%) or have cleaned their rangehood in the last 3 months (50%).

Lower income households, renters and people living in social housing, people with lower education levels, and Aboriginal and Torres Strait Islander people were less likely to report their rangehood is working and vents to the outside.

Figure 18: Rangehood details among respondents with rangehoods (n=4,139)

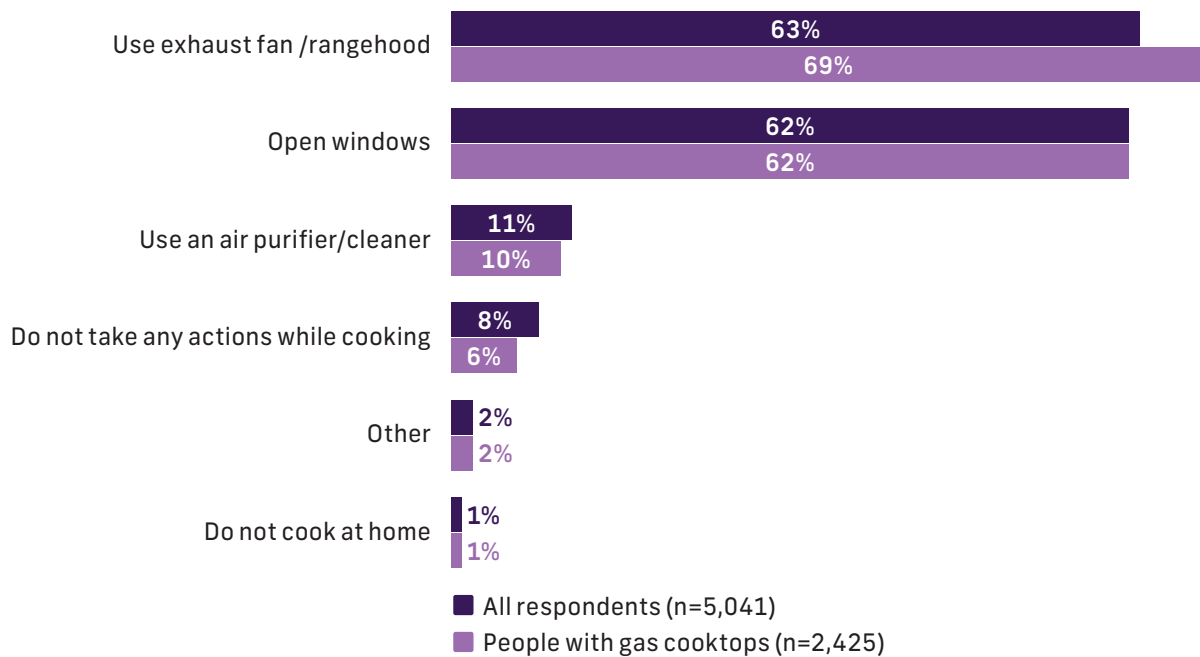


Actions taken while cooking to reduce cooking smells, smoke or moisture

Taking actions while cooking, such as using a rangehood, opening windows or using an air purifier, can help to improve indoor air quality and reduce exposure to air pollution produced while cooking. This can include emissions from gas cooktops and emissions produced by certain cooking methods such as frying, grilling, baking or toasting. The survey asked participants about what actions they take regularly while cooking, if any.

Most respondents (91%) take at least one action while cooking to reduce cooking smells, smoke or moisture. Most commonly, people reported using their rangehood (63%) and opening windows (62%).

Figure 19: Actions taken while cooking to reduce cooking smells, smoke or moisture



Who was more likely to report taking any action while cooking to reduce cooking smells, smoke or moisture?



Aboriginal and Torres Strait Islander people were **2.4 times more likely** to report taking any action compared to non-Aboriginal or Torres Strait Islander people.



People with asthma were **slightly more likely (1.2 times)** to report taking any action compared to people without asthma.



People with allergies were **1.5 times more likely** to report taking any action compared to people without allergies.



There was a **decreasing trend** in the likelihood of taking action by **increasing age**.



People with children in the household were **1.4 times more likely** to take action when cooking compared to people without children.



Renters and people living in social housing were **less likely** to take action while cooking compared to homeowners (30% and 20% less likely respectively).



There was an **increasing trend** in the likelihood of taking action by **increasing household income**.

Differences in individual actions by population groups



People who live in social housing were **less likely** to report using a rangehood or exhaust fan (46%) compared to those who rent (58%) or own their home (70%).



People with asthma were **slightly more likely** to report taking actions including opening their windows (65%) and using an air purifier (13%), compared to people without asthma (62% and 10% respectively).



Aboriginal and Torres Strait Islander people were **less likely** to report using an exhaust fan while cooking (47%) compared to non-Aboriginal or Torres Strait Islander people.



People with a bachelor's degree or above were **more likely** to report using an air purifier (17%) compared to people whose highest level of education was a certificate or diploma (9%) or people whose highest level of education was year 12 or below (7%).

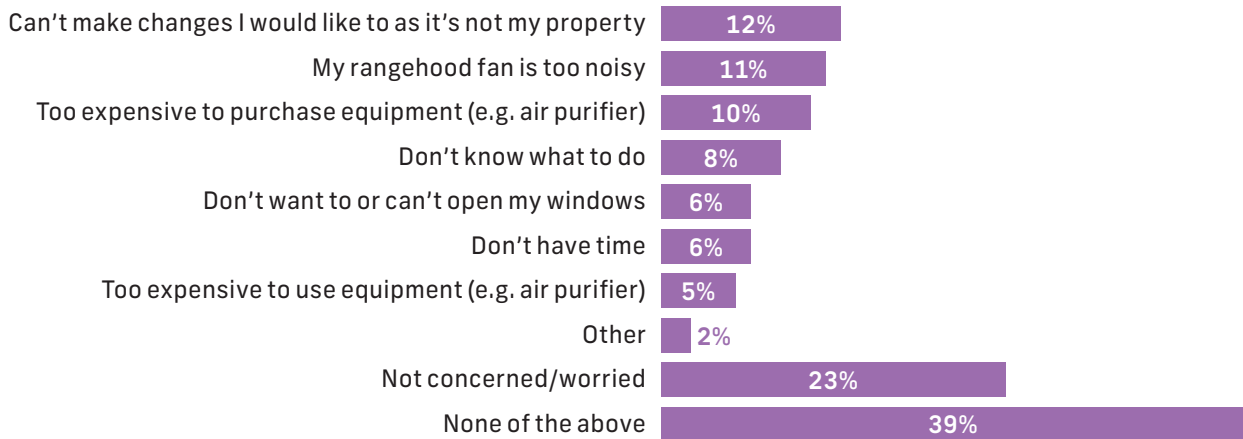


People in major cities were **more likely** to report using an air purifier (12%) compared to people in regional or remote areas (10%).

Barriers to taking action while cooking to reduce cooking smells, smoke or moisture

Nearly two-thirds of people (61%) reported at least one barrier to taking action to reduce cooking smells, smoke or moisture. One in ten people reported being unable to make changes because they don't own their home, their rangehood fan is too noisy, or being unable to purchase equipment such as an air purifier because of the cost. One quarter of respondents said they were not concerned or worried about taking action to reduce cooking smells, smoke or moisture while cooking (23%).

Figure 20: Barriers to taking action to reduce cooking smells, smoke or moisture



Who was more likely to face any barriers to taking action?

This includes any barrier, except not being concerned or worried



Renters were **1.6 times more likely** and people living in social housing were **2.5 times more likely** to report barriers compared to homeowners.



Aboriginal and Torres Strait Islander people were **1.6 times more likely** to report barriers than non-Aboriginal or Torres Strait Islander people.



People with asthma were **1.3 times more likely** to report barriers than people without asthma.



People with allergies were **1.4 times more likely** to report barriers than people without allergies.



People with a bachelor's degree or above were **1.5 times more likely** to report barriers than people whose highest level of education was year 12 or below.



There was a **decreasing trend** in barriers by **decreasing age**.



People living in major cities were **1.3 times more likely** to report barriers than people in regional or remote areas.

Differences in individual barriers by population groups



One third of people living in social housing (33%) and people renting (31%) said they are unable to make changes they would like to because they do not own their home.

People who own their home were **more likely** to say they are not concerned or worried (24%) compared to people live in social housing (20%) or who rent (22%).

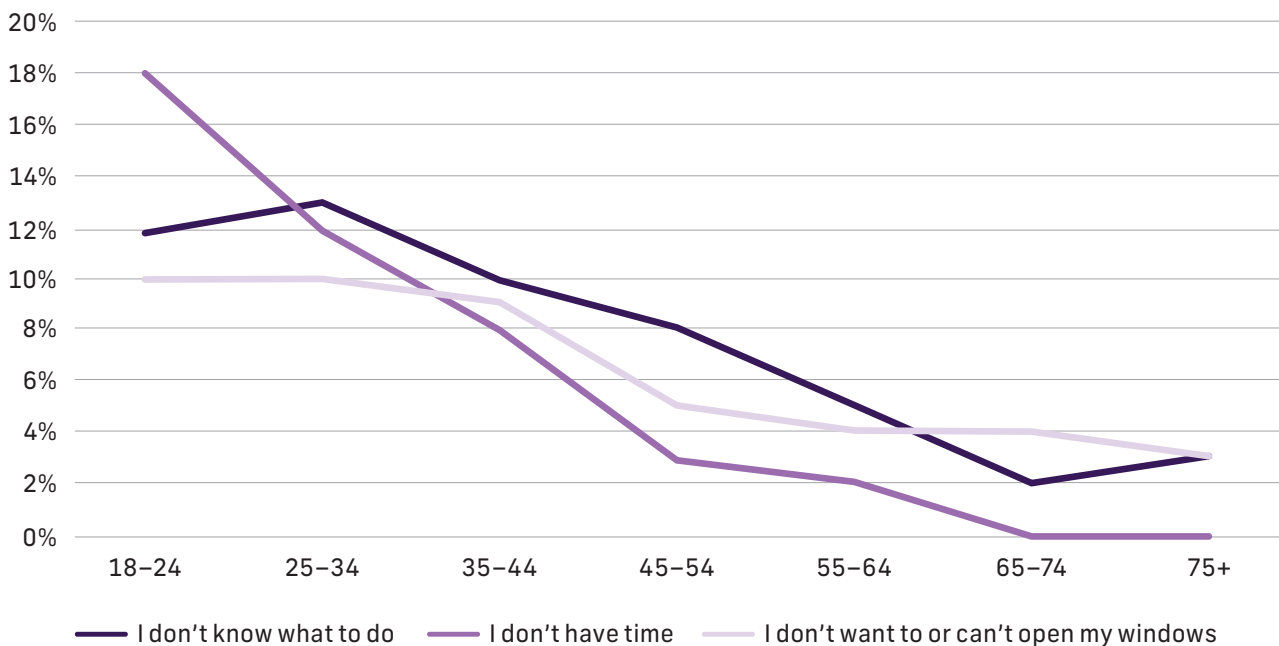


In particular, young people were **more likely** to report not knowing what to do, not having enough time, and not wanting or being able to open their windows (see figure 21).



People without asthma were **more likely** to say they are not concerned or worried (24%) compared to people with asthma (20%).

Figure 21: Percentage of people reporting they don't know what to do, don't have time or can't open windows by age



Mould and dampness

Mould is common in damp places like showers, sinks and near leaky pipes. It can also grow in poorly ventilated and maintained homes. Dampness is associated with mould. No amount of mould is considered safe for health, as it produces millions of airborne spores that can be inhaled.

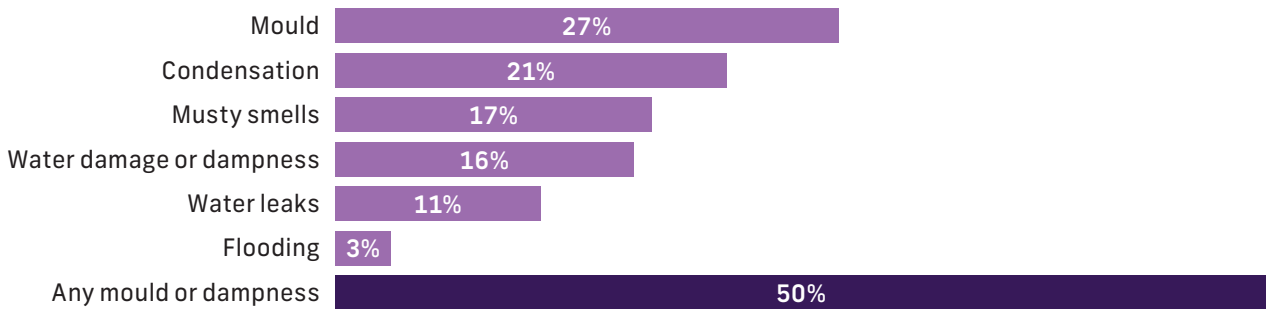
Breathing in mould can irritate the airways and trigger an allergic response. Both these reactions can lead to an asthma flare-up and a range of other health problems.

Presence of mould and dampness

One third of respondents (34%) reported mould in their home in the last 12 months (defined as visible mould or musty smells, which can indicate the presence of mould). One third of respondents (34%) reported dampness in their home in the last 12 months (defined as any water damage, condensation, water leaks, or flooding), which is often a precursor to mould.

Half of respondents reported either **mould, dampness or both** in their home in the last 12 months.

Figure 22: Presence of mould or dampness in the home in the last 12 months



Who was more likely to report mould or dampness in the home?



Aboriginal and Torres Strait Islander people were **2.3 times more likely** to report mould and 6.5 times more likely to report dampness compared to non-Aboriginal or Torres Strait Islander people.



People living in social housing were **more than twice as likely (2.3 times)** to report mould in their home than people who owned their own homes. Similarly, renters were **nearly twice as likely (1.9 times)** to report mould than homeowners. This was similar for presence of dampness.



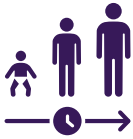
People with asthma were **1.4 times more likely** to report mould and **1.6 times more likely** to report dampness than people without asthma.



People with allergies were **1.7 times more likely** to report mould and dampness than people without allergies.



People with a bachelor's degree or above were **1.4 times more likely** to report the presence of mould than people whose highest level of education was year 12 or below.

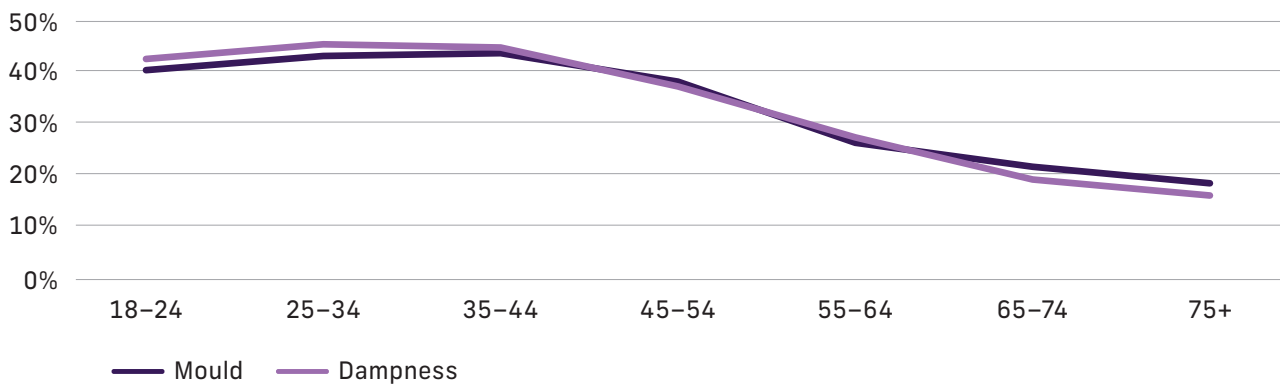


There was a **decreasing presence** of mould and dampness reported with **increasing age** (see figure 23).



People with children in the household were **1.6 times more likely** to report mould and **1.7 times more likely** to report dampness than people without children in the household.

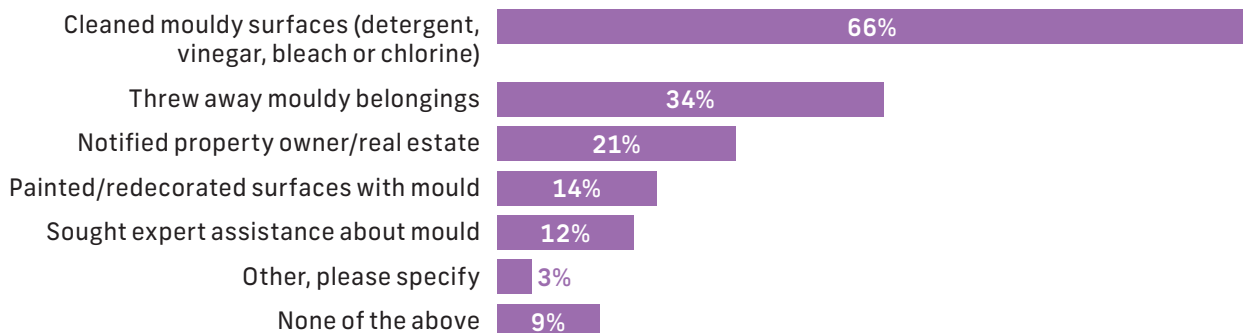
Figure 23: Presence of mould by age



Actions taken in the last 12 months to remove or reduce the spread of mould

Among the 34% of respondents who reported mould in their home, nearly all (91%) had taken action in the last 12 months to remove or reduce the spread of the mould. Two thirds (66%) reported cleaning mouldy surfaces with detergent, vinegar, bleach or chlorine.

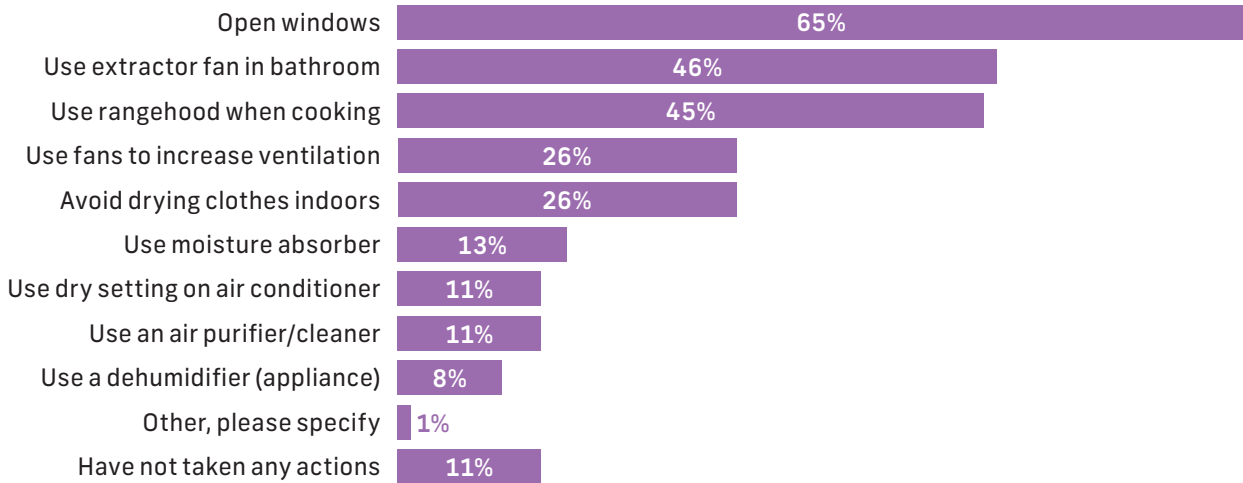
Figure 24: Actions taken in the last 12 months to reduce or prevent the spread of mould by people with mould in the home (n=1,728)



Regular actions taken to remove, prevent or reduce the spread of mould

Nearly all respondents (89%), reported **taking action regularly** to remove, prevent or reduce the spread of mould. Most commonly, people reported opening their windows (65%), using an extractor fan in the bathroom (46%) and using a rangehood when cooking (45%). There were similar proportions of people taking action among all respondents and those with mould in the home.

Figure 25: Regular actions taken to reduce, remove or prevent the spread of mould



Who was more likely to take any regular action to remove, prevent or reduce the spread of mould?



Aboriginal and Torres Strait Islander people were **1.7 times more likely** to take action than non-Aboriginal or Torres Strait Islander people.



People with asthma were **1.7 times more likely** to take action than people without asthma.



People with allergies were **twice as likely** to take action compared to people without allergies.



People whose highest level of education was a certificate or diploma were **1.4 times more likely** to take action and people with a bachelor's degree or above were **1.3 times more likely** to take action than people whose highest level of education was year 12 or below.



Households with less than \$40,000 annual income were **least likely** to take action, compared to all other household income brackets.

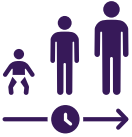


People with children in the household were **1.3 times more likely** to take action than people without.

Differences in individual actions by population groups

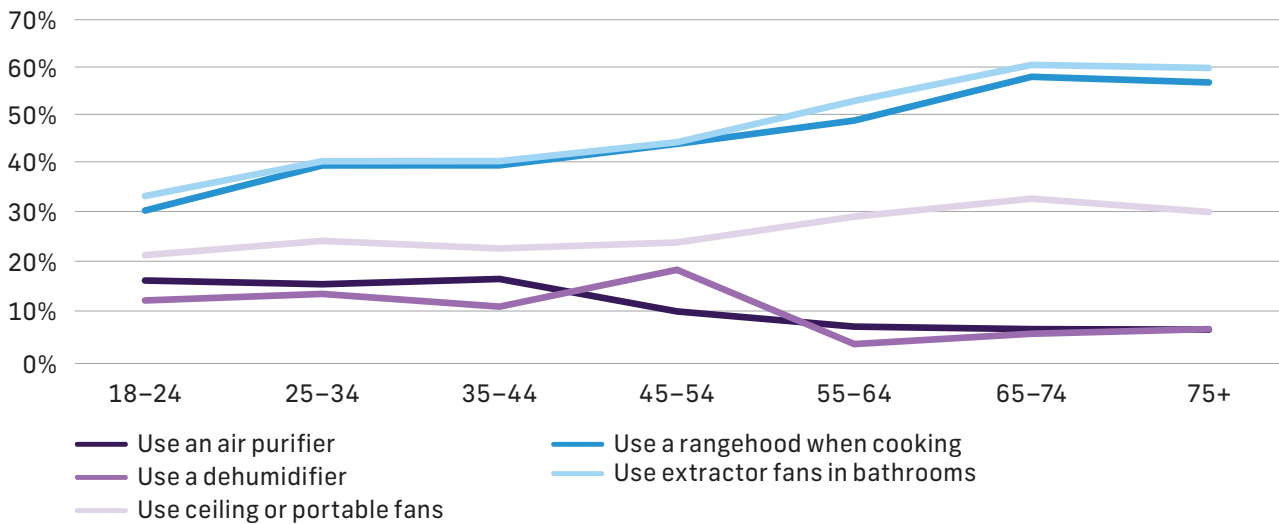


People who own their home were **more likely** to report using an extractor fan in the bathroom (51%) or rangehood when cooking (50%) compared to people who rent from a real estate agent (44% and 41% respectively), and people who live in social housing (40% and 34% respectively).



People were **less likely** to report using an air purifier or dehumidifier with **decreasing age**. However, people were **more likely** to report using ceiling fans, extractor fans in bathrooms and rangehood while cooking with **increasing age** (see figure 26).

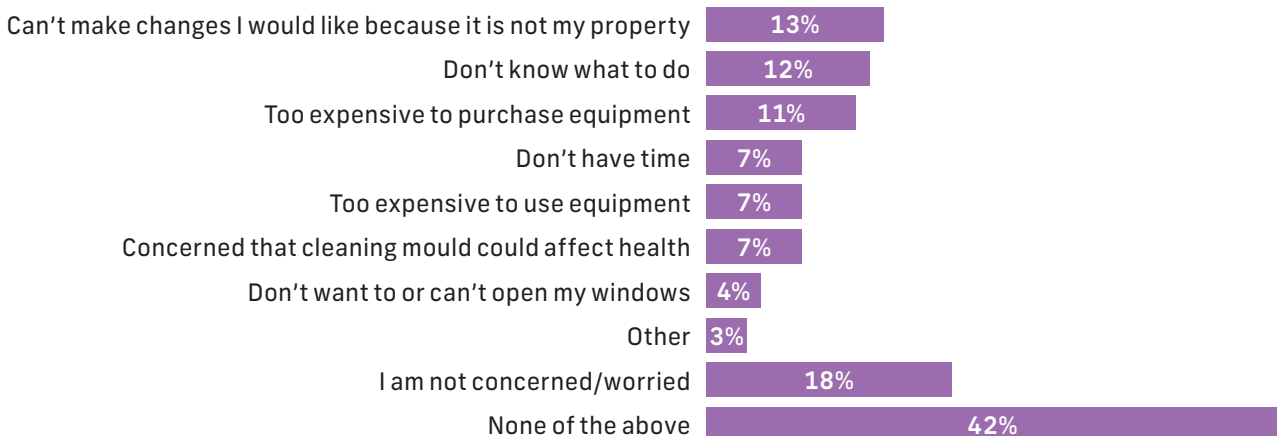
Figure 26: Regular actions taken to remove, prevent or reduce the spread of mould by age



Barriers to taking action to remove, prevent or reduce the spread of mould

More than half of respondents (58%) reported at least one barrier to taking action to remove, prevent or reduce the spread of mould in the home. Most commonly people reported they were not concerned or worried about mould (18%), cannot make changes because they do not own their home (13%) or do not know what to do (12%).

Figure 27: Barriers to taking action to remove, prevent or reduce the spread of mould



Who was more likely to face any barriers to taking action to address mould?

This includes any barrier, except not being concerned or worried



People living in social housing were **2.4 times more likely** to report facing barriers than homeowners. Likewise, renters were twice as likely to report barriers than homeowners.



Aboriginal and Torres Strait Islander people were **1.5 times more likely** to report barriers than non-Aboriginal or Torres Strait Islander people.



People with asthma were **1.3 times more likely** to report barriers than people without asthma.



People with allergies were **1.4 times more likely** to report barriers than people without allergies.



People who have completed a bachelor's degree or above were **1.3 times more likely** to report barriers than people whose highest level of education was year 12 or below.

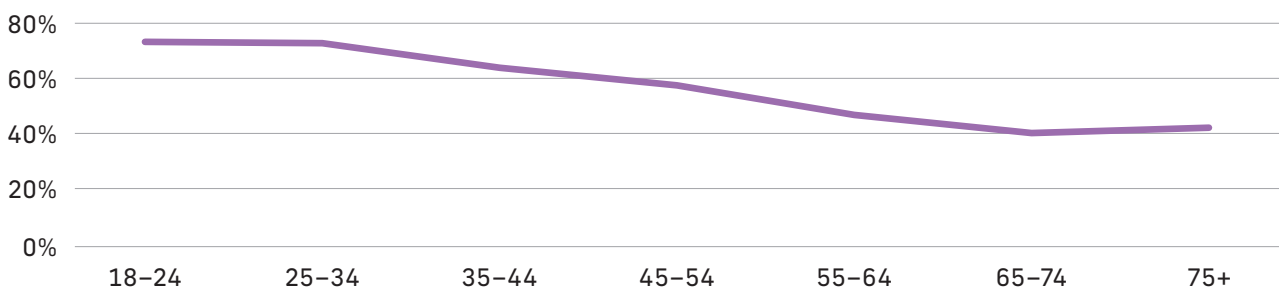


There is a **decreasing trend** in the likelihood to report barriers, with **increasing age** (see figure 28).



People in major cities were **1.2 times more likely** to report facing barriers than people in regional or remote areas.

Figure 28: Percentage of people reporting any barrier to addressing mould by age



Differences in individual barriers by population groups



One third of people living in social housing (29%) or renting (33%) reported they cannot make changes they would like to because they do not own their home.

People who own their home were **more likely** to say they are not concerned or worried (20%) than people who rent (15%) or living in social housing (17%).



People living in major cities were **almost twice as likely** to report they don't know what to do (13%) compared to people living in regional/remote areas (8%).



People with asthma were **almost twice as likely** to report being concerned that cleaning mould could affect their health (10%) compared to people without asthma (6%).

More people without asthma said they are not concerned or worried (19%) compared to people with asthma (17%).



People living in higher income households were **more likely** to report they don't know what to do or don't have time to take action.

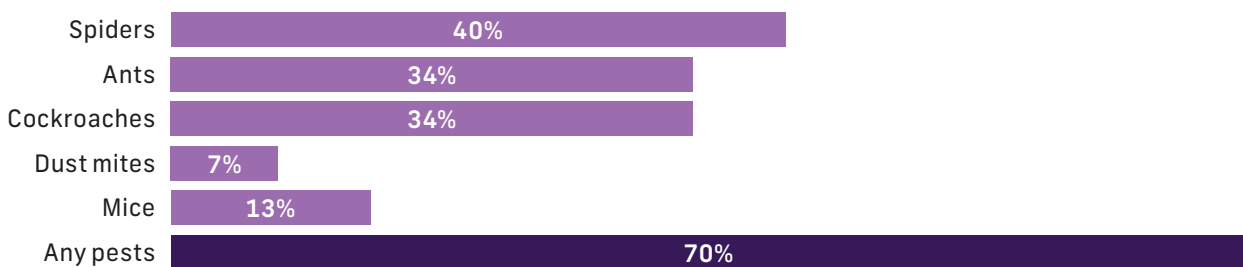
Pests

Ants, spiders, mice and cockroaches are a source of airborne allergens that can cause allergic reactions and trigger asthma flare-ups. These reactions can be caused by the proteins found in the flakes of skin or dander, saliva or urine of pests. Dust mites, tiny insects which live in household dust, are also a common trigger for asthma. Dust mites can also trigger asthma and allergy symptoms, and are associated with an increased risk of asthma in childhood.

Presence of pests

More than two thirds of respondents (70%) reported the presence of spiders, ants, cockroaches, dust mites or mice in their home in the last 12 months.

Figure 29: Presence of pests in the last 12 months



Who was more likely to report pests?



Pests were more common in regional and remote areas. People in major cities were **30% less likely** to report pests compared to people living in regional and remote areas.

Presence of mice, spiders and ants was higher in regional and remote areas. However, presence of cockroaches and dust mites was higher in major cities.



People living in social housing were **1.7 times more likely** to report pests compared to home owners.

In particular, people living in social housing were more likely to report dust mites (13%) compared to homeowners (7%) and renters (6%).



People with asthma and allergies were **more likely** to report pests than people without asthma or allergies (1.6 and 1.5 times, respectively).

In particular, people with asthma were **more likely** to report dust mites than people without asthma (12% and 6% respectively).



Aboriginal and Torres Strait Islander people were **twice as likely** to report pests than non-Aboriginal or Torres Strait Islander people.

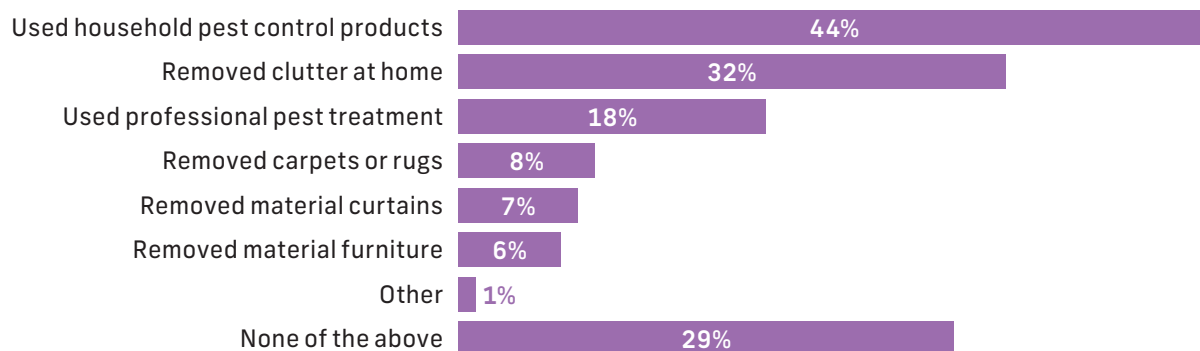


People with children in the home were **1.4 times more likely** to report pests than people without children in the home.

Actions taken to remove, prevent or reduce pests in the home

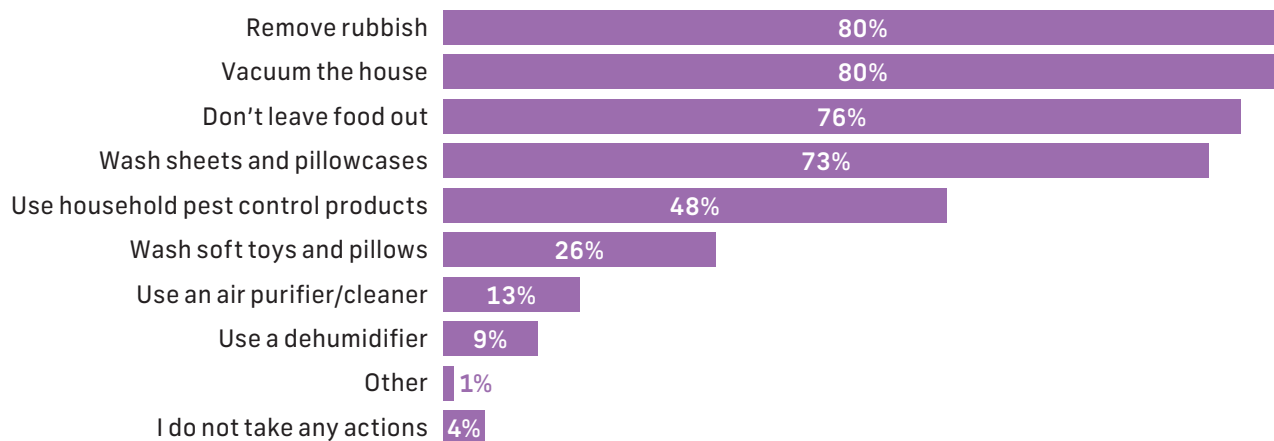
Most participants (71%) had taken action in the last 12 months to reduce pests in the home. Annual actions refer to actions people may have taken in the past year but would not be undertaking regularly (e.g. more than monthly). Most commonly, participants reported using household pest control products (44%) and removing clutter in the home (32%).

Figure 30: Annual actions taken to remove, prevent or reduce exposure to pests



Nearly all participants (96%) reported taking actions regularly to reduce pests in their home. Regular actions refer to actions people may be doing at a daily, weekly or monthly frequency. Most commonly, participants reported removing rubbish (80%), vacuuming the house (80%) and not leaving food out (76%).

Figure 31: Regular actions taken to remove, prevent or reduce exposure to pests



Who was more likely to report taking any regular or annual actions to remove, prevent or reduce exposure to pests?



People living in social housing were **1.6 times more likely** to take regular actions against pests than homeowners, however they were 30% less likely to take annual actions against pests.



Aboriginal and Torres Strait Islander people were **4.2 times more likely** to take regular actions against pests than non-Aboriginal or Torres Strait Islander people. However, they were **60% less likely** to take annual actions.



People with asthma were **2.6 times more likely** to take regular actions against pests than people without asthma. However, they were slightly less likely to take annual actions.



People with allergies were **3.3 times more likely** to take regular actions against pests than people without allergies. However, they were slightly less likely to take annual actions.



There was a **decreasing trend** in taking regular action with **increasing annual household income**. There was little variation in annual actions by household income.



People with children in their home were **1.3 times more likely** to take regular actions against pests than people without children in the household. However, they were **less likely** (25% less) to take annual actions.



People in major cities were **1.3 times more likely** to take annual actions against pests.

Differences in individual actions by population groups



Higher income households were **more likely** to report using an air purifier (18%) and dehumidifier (18%) to reduce pests in the home compared to low-income households (9% and 8% respectively).



One fifth of people who own their home (21%) reported having professional pest treatment, compared to 17% of people living in social housing and 12% of people who rent.

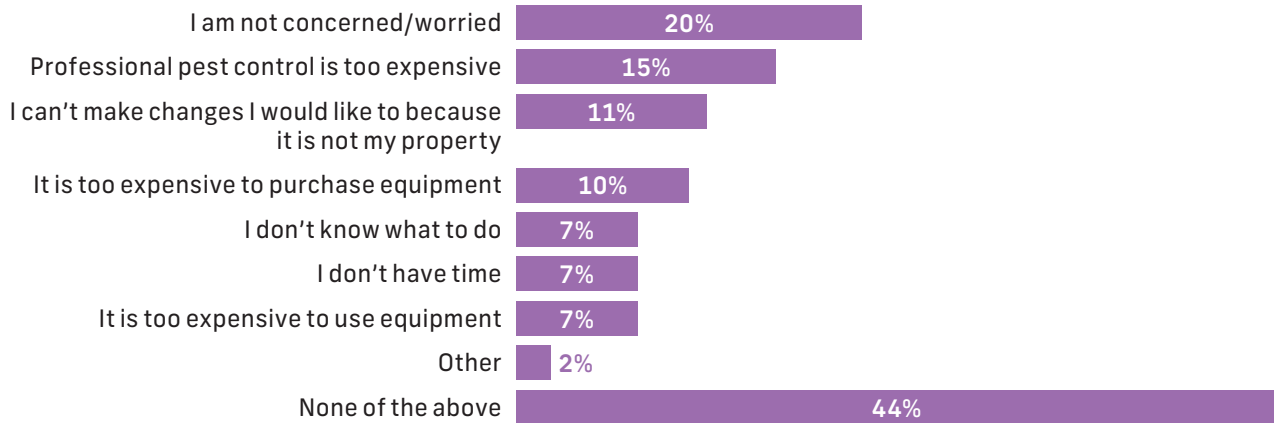


People in regional and remote areas were **more likely** to report using household pest control products (54%) compared to people in major cities (46%).

Barriers to taking action to reduce pests in the home

More than half of respondents (56%) reported facing a barrier to reducing pests in their homes. One fifth of respondents (20%) reported they were not concerned or worried about pests, and 15% said professional pest control was too expensive.

Figure 32: Barriers to taking action to reduce pests in the home



Who was more likely to face any barriers to taking action against pests?

This includes any barrier, except not being concerned or worried



People living in social housing were **2.3 times more likely** to report barriers and renters were **1.7 times more likely** to report barriers than homeowners.



Aboriginal and Torres Strait Islander people were **1.8 times more likely** to report facing barriers than non-Aboriginal or Torres Strait Islander people.



People with asthma were **1.3 times more likely** to report facing barriers than people without asthma.



People with allergies were **1.5 times more likely** to report facing barriers than people without allergies.



People who have completed a bachelor's degree or above were **1.3 times more likely** to report barriers than people whose highest level of education was year 12 or below.

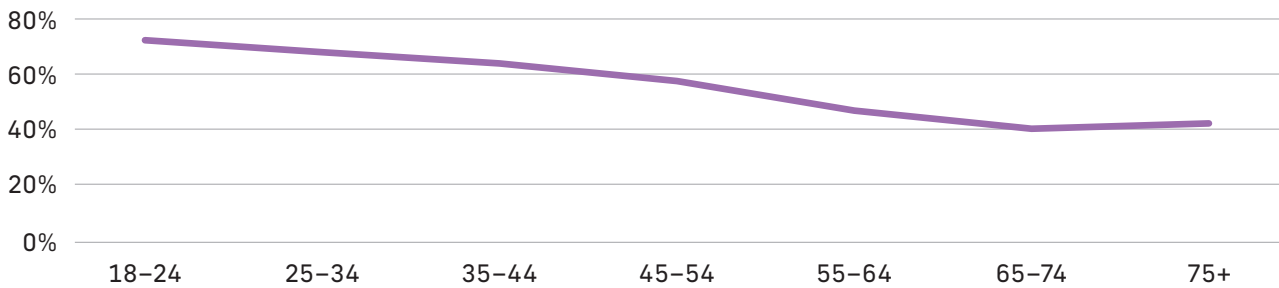


The percentage of people reporting facing barriers **decreased with age** (see figure 33).



People living in households with an annual income of less than \$40,000 a year were **more likely** to report facing barriers to taking action. There was a **decreasing trend** in likelihood to report barriers by **increasing household income**.

Figure 33: Percentage of people reporting any barrier by age



Differences in individual barriers by population groups



People who own their homes were **more likely** to report they are not concerned or worried (22%) compared to people who rent from a real estate agent (18%) or people living in social housing (16%).



People in major cities were **more likely** to report they didn't know what to do to reduce pests (8%) compared to those in regional/remote areas (5%).

All barriers

Common barriers

Respondents were asked about a number of common barriers to taking actions that can reduce their exposure to cooking emissions (from cooking processes or gas cooktops), mould, and pests, as well as barriers to switching heating or cooktop types. These common barriers are described in the tables below and aggregated for the total percentage of people reporting these barriers to at least one of the triggers.

One quarter of participants (25%) reported the cost of purchasing or using equipment, such as air purifiers, was too expensive. One fifth of respondents (21%) reported being unable to make changes they would like to because they do not own their home.

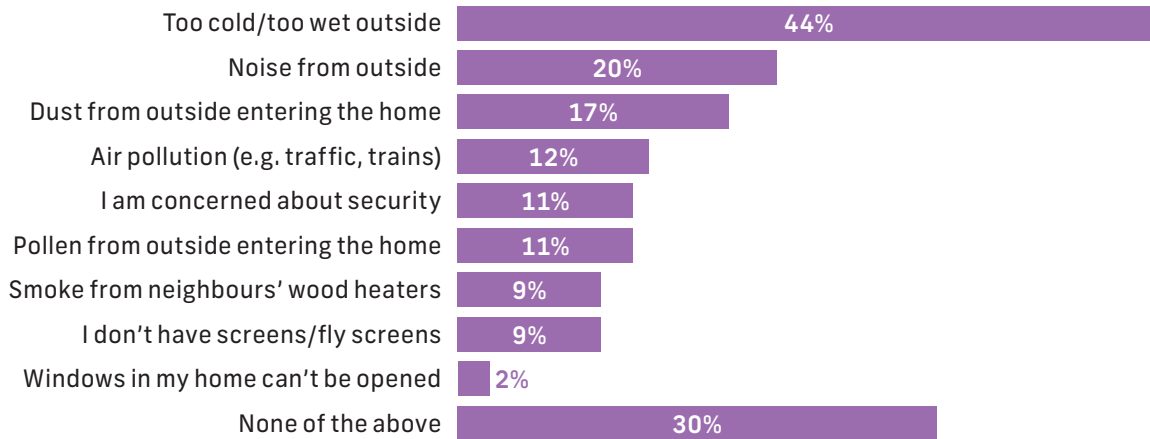
Common barriers to taking action to reduce exposure to cooking emissions, mould and pests				
Barriers	Cooking emissions	Mould	Pests	Total respondents reporting the barrier to at least one of the triggers
Not concerned/worried	23%	18%	20%	38%
Too expensive to purchase equipment (e.g. air purifier)	10%	11%	10%	25%
Too expensive to use equipment (e.g. air purifier)	5%	7%	7%	
Can't make preferred changes because it is not my property (among all respondents)	12%	13%	11%	21%
Can't make preferred changes because it is not my property (among renters or people living in social housing only n=1,401)	31%	31%	25%	49%
Don't know what to do	8%	12%	7%	18%
Don't have time	6%	7%	7%	14%
Don't want to or can't open windows	8%	4%	n/a	9%

Common barriers to switching heating or cooktop types			
Barriers	Switching heating (n=2,152)	Switching cooktop (n=1,439)	Total respondents reporting the barrier to switching heating or cooktop (n=2,850)
Too expensive to replace	43%	43%	47%
Energy costs are too expensive	27%	17%	27%
Can't make preferred changes because it is not my property (among all respondents)	32%	35%	34%
Can't make preferred changes because it is not my property (among renters or people living in social housing only)	64% (n=737)	75% (n=470)	71% (n=932)

Windows

Opening windows is a common action across household triggers. Most people (70%) reported at least one barrier to regularly opening their windows, most commonly it being too cold or wet outside (44%), while outside noise was the next most common barrier (20%), followed by dust (17%) and air pollution (12%) from outside entering the home.

Figure 34: Barriers to opening windows regularly



Who was more likely to report barriers to opening windows regularly?



People with asthma and allergies were **more likely** to report barriers to opening windows due to dust entering the home, air pollution, pollen and smoke from neighbours' wood heaters compared to people without asthma or allergies.



People living in major cities were **more likely** to report noise from outside as a barrier to opening their windows (22%) compared to people in regional areas (15%). They were also more likely to report air pollution as a barrier (13%) compared to people in regional areas (8%).



People who rent from a real estate agent were **more likely** to report not having fly screens as a barrier to opening their windows (14%) compared to people living in social housing (9%) and people who own their home (6%).

People living in social housing (14%) and people who rent from a real estate agent (13%) were **more likely** to report concern about security as a barrier compared to people who own their home (10%).

Open text responses

Participants were also asked to describe any other challenges they faced or explain further the challenges asked about in the survey. Almost 2,000 participants provided further information or described additional challenges they faced to reduce their exposure to or remove triggers in the home.

These included:



Renters describing difficulties getting landlords or real estate agents to address triggers or approve them to take action in their home. People described the time required to follow up requests, frustration with lack of action from landlords or agents, and in some cases choosing not to ask for action to be taken because they were concerned this might lead to case of rent increases or eviction.

"Because I am renting, I am limited in what I can do. I would prefer a place without carpet but unfortunately this is a rental with carpet. There are also repairs that need done but my landlords are not the nicest people to approach as I rent privately through them."

"As this is not my home and only a small section of it downstairs, I don't like to complain as I'm frightened the rent will increase and being on an aged pension, I dread thinking about it. Rents in my area are very expensive."

"Because I rent **getting anything done requires getting permission first**, which then takes a long time, as the landlord doesn't get things done quickly, if at all, and is VERY tight with her money, and being on a disability pension makes it nigh on impossible to afford anything myself, so **I just have to make do**, with everything that happens, even more so now, with the way the rental market is."

"I am unemployed so do not have the funds to do anything. Also **asking my real estate agent to do something might increase my rent.**"

"I have a problem in the bathroom. The door frame at the bottom is rotted from damp and **I now have mushroom growth. I use bleach every time they pop up but because it's below the floor I can only kill what I can get to.** Told my landlord and will see what if anything changes. I doubt it."

"I have contacted the real estate as this has been an ongoing issue and **they don't seem to care** and why should I have to pay for a professional person to clean mould."

"I live in a rental, and they are terrible at doing any sort of maintenance, and so **I feel like they would penalise me if I mentioned potential mould.**"

"I live in a rental house during a rental crisis so **I do not want to do anything that will make the real estate want to remove me from the property.**"

"I rent, and the property manager takes ages to get back to me. There is currently mould in all rooms as since rainy days have come, I've noticed all the windows leak. They have not replied to my email. **It took them six months to address the fact I had no hot water so I'm not holding my breath (which is possibly affected my mould, haha, love being a tenant during a housing crisis!).**"

"I would like things done but afraid the owner will put up the rent. The extraction fan in the bathroom has never worked and I have been here over 3 years. The owner knows about it."

"It is difficult with the current rental situation to get the landlord to make changes to the home. **If we complain too much we will get evicted.**"

"Our shower gets very mouldy due to bad ventilation in the bathroom. Have raised it with our property manager but **they were unconcerned.**"



Social housing tenants describing being unable to address triggers in the home due to needing permission to make a change to the home or lack of action taken by the housing provider. For many, this was compounded by personal financial limitations.

“Door frames and window frames in my property leak air, and this allows entry to insect pests, and there are holes in the floor which allows entry to mice and insects. **I cannot afford to have these fixed and the manager of my property (government housing) refuses to fix them.**”

“I am in a government property. I am not allowed to install things into the property and have to get approval. **My requests have been declined because it is seen as not required/unnecessary, and I'm told I just have to clean more.**”

“I live in government housing, and **I have to get permission every time** I want to do something to my property.”

“I've notified government housing maintenance, but they're not very reliable and **[they] don't really care about what we're living in.** I'm also a single mother on Centrelink so can't really afford to replace/fix everything! I long for the days I can return to work so I can get a better place for my kids & myself.”

“Mainly just the fact we aren't allowed to adjust the house in any way except for going through housing but **you tell them about it and they don't care about the mould** just say we need to wipe the condensation more often and if they get a professional it will take 6–12 months before they do anything about it.”



The cost of taking action to reduce triggers or exposure was prohibitive for many people. Many people said this was exacerbated by the current cost of living crisis or because they were on pensions.

“Having **limited income makes it harder** to keep affording yearly pest control sometimes it only gets done every second year.”

“Affordability, **[I would] like an air purifier but they are all too expensive.**”

“As a pensioner, **I can neither afford nor physically deal with** quite a few of these solutions.”

“Cost is a factor. I find anything related to home care to be very expensive and **other costs take priority.**”

“**Cost of living increase** including groceries, bills and everyday items **makes it harder to initiate action.**”

“Getting an air purifier is something I have been wanting to do. I haven't had the time to research for one **or enough money set aside** for one at this time.”

“I am a renter, just covering the monthly rent is a miracle. **Anything extra is a fantastic luxury.**”

“I have a chronic illness and **can only just afford** to pay existing bills. There is no money left over each week to be able to purchase/run things that could help avoid all of the above.”

“I have budget limitations to install some items that would help (e.g. a fan in the bathroom and exhaust for rangehood). **I would like to buy an air purifier but** again have no budget with rising interest rates and cost of living.”

“I have moved my bedroom into my lounge room so I don't need to heat more than one room in the house, but the house is old and has no insulation, so I need to keep curtains closed, doors closed, everything closed **in order to lessen my gas and electricity bills.** This is bad for dust, mould and condensation but I have to keep the kitchen and lounge all sealed up or I just freeze.”

“I live on an Aged Pension and therefore am on a very limited income. **Anything that is outside the absolute necessities is out of my financial reach.**”

“I would like to change my gas stove to electric but too expensive. **I don't understand why it's so expensive** especially having children in the house I find electric is easier and safer for the family.”

“The major thing that triggers my asthma is cold air so I have to make sure my house is warm all the time. I can't breathe if the air is cold. I try to clean the mould off the walls when it grows in winter. **I can't afford expensive solutions on my pension.** The air is too cold to open the windows in winter.”

“We have noticed mould recently, especially after the rain and flooding but **just don't have the money to buy a dehumidifier.** As well as there not being any stock available near us.”



Physical disabilities, illness or injury making it hard or impossible to take action.

"Cannot afford to pay someone to check or deal with these issues and **don't have the energy or wellness to keep up with maintenance myself.**"

"I am only on the disability pension, so I don't have the money to afford professionals. **I have very poor health so I can't do it myself.** The smell of almost all decent cleaners make me very very sick."

"You know, just the motivation and the mindset of being a depressed individual. **Everything is like a chore.**"

"I don't have the will power, **struggling with mental health issues.**"

"I have a chronic illness that **make cleaning difficult for me.**"

"I have a disability which **makes many tasks difficult for me.**"



Challenges due to their home location including air pollution from outside/neighbours and presence of pests being more common in rural or regional areas.

"**A lot of pollen gets in the house** and has a negative impact on my allergies."

"As the area we live in being in a farming community **it is hard to keep rats and mice out of the house.** I have tried traps but they always seem to be there."

"Even opening windows poses problems in our rental property. **It blows dust and dirt into the house.**"

"I do not have any problems with Mould but do have problems with mice and constantly have traps set in the house. **My home is in a country area so mice are not unusual.** Keeping the house clean and clutter free helps enormously."

"Yes, the fact that **everyone in Australia seems obsessed with using wood heaters** and not knowing how to use dry wood to burn in them creates an obscene amount of smoke. This happens everywhere and **ruins the quality of life for people like me.** I can't go outside in winter, dry my clothes outside or open windows. Nothing is being done about this while the rest of the world knows how dangerous wood smoke is to health."

"Its more about keeping the neighbours reeking, stinking, vomit inducing wood burning smoke out of my house, so I have to run around madly shutting windows and doors as soon as they fire up their fireplace in the afternoon. **Disgusting, wood burning heaters should be banned by all suburban Councils.**"



Lack of information about the best way to address or prevent triggers in the home.

"I googled for help for mould but **the advice is mixed** and doesn't seem thorough. Most of the advice is temporary light touch things like using vinegar. But the mould keeps coming back. There are lot of businesses but they don't seem to have a licensing scheme so **I have no idea who to trust** and who is just selling snake oil."

"**I'm not 100% sure how to deal with the mould** other than cleaning with vinegar and other cleaning products."

"Mainly money and knowledge. **Wouldn't know where to start** to assess air quality and fear any treatment will be too expensive."

"Sometimes it's that I **didn't realise some things could cause problems**, such as drying clothes indoors, I haven't had a choice lately, but if that encourages mould now I am nervous."

"Sometimes, it is just a **lack of knowledge** as to the best way to control an issue, or to even realise something could be an issue."

"**I wish I had more knowledge** about what needs to be done, like where do I find this info?"

"We have a wood fire and the smell often bothers me but I **don't know how to stop it.** It's too cold to open windows."



A lack of time amongst other day-to-day activities, most of which take priority over extra maintenance.

"**Don't have the time** to do a thorough clean and I don't have the proper air purification equipment to properly ventilate my home."

"Mould builds up in the bathroom and at this stage we can only use the fan and open windows. The fan is not directly above the shower, so it does not reach very far. We have been meaning to ask the landlord if we can get this fan moved however have not done this yet **due to not enough time for life admin** to sort this out at this stage."

"**Sometimes finding the time to do more is hard.** Outsourcing help can be expensive. I do find that my asthma is worse inside my home than when I'm at work though."

"I have some troubles taking care of my house as I have a business to take care **so I really do not have time for household chores**, and sometimes I really am exhausted from work."



Lack of action being taken by other people in the house, or a disagreement about taking action.

"I know that mould is growing in certain places in the winter months but it's too hard to keep that place ventilated as **my partner does not want to open the glass sliding door because it's too cold.** Also, the dehumidifier is too noisy to have on when we are home, and I don't want to put it on when we are not home."



Cleaning products triggering allergy or breathing problems, general concern about health and environmental impacts of cleaning products, or concerns about use of pest products in homes with pets.

"I don't feel that there is information about reducing and improving air quality and pest control in **natural more environment friendly ways.**"

"I have due to severe allergies minimised the use of products in my home that cause poor air quality, **I use non perfume products and low chemical cleaning products** and regularly air out my house."

"**I have to be careful** about what chemicals etc I use to clean and remove mould/pests due to having indoor pets."

KEY FINDINGS

1 Homes are not healthy places for all Australians, particularly people with asthma or allergies.

Nearly all Australians (88%) agreed that having good air inside their home is important to them, and most (76%) say they are happy with the air quality inside their home. However, one quarter of Australians (24%) are not happy or are unsure about the air quality inside their homes.

While homes should be places that improve our health and wellbeing, among people with asthma and allergies, three in ten reported that their symptoms are worse after spending time in the home. People with asthma and allergies are sensitive to substances we all breathe, which are referred to as 'triggers' because they trigger asthma and allergy symptoms.

2 Many Australians are exposed to asthma triggers in their home including mould, emissions from gas appliances and wood heaters, and pests such as dust mites.

- a. 50% of Australians have had mould or dampness in their home in the last 12 months, with one third (34%) reporting mould in their home. Dampness is associated with mould. No level of mould is safe for health, for people with and without asthma. Exposure to mould also increases the risk of developing asthma.
 - b. 48% of Australians use a gas cooktop for cooking in the home. The combustion of gas during cooking produces a variety of air pollutants including fine particulate matter, nitrogen dioxide, carbon monoxide, and formaldehyde, worsening indoor air quality. Exposure to these pollutants can trigger asthma flare-ups and contribute to the development of asthma.
 - c. 7% of Australians use unflued gas heating regularly during cooler months. As with gas cooking, the combustion of gas produces a variety of air pollutants including fine particulate matter, nitrogen dioxide, carbon monoxide, and formaldehyde. Unflued gas heaters are particularly dangerous because the pollutants remain inside the home rather than being vented outside.
 - d. 70% of Australians have had pests (including spiders, ants, cockroaches, dust mites and mice) in their home in the last 12 months. Airborne allergens from these pests can trigger allergic reactions, asthma flare-ups, and some of these allergens are associated with an increased risk of developing asthma.
 - e. 13% of Australians use wood heating regularly during cooler months. Burning wood in wood heaters produces fine particulate matter, which can trigger asthma flare-ups, contribute to the development of asthma, and lead to other health issues.
-

3 Groups more likely to report exposure to pests, mould, and emissions from unflued gas heating include Aboriginal and Torres Strait Islander people, people with asthma and allergies, people with children in the home and (for mould and pests) people living in social housing.

Exposure to pests, mould, and emissions from unflued gas heating was more common among certain priority populations and those more vulnerable to the impacts of exposure to these triggers.

- a. Aboriginal and Torres Strait Islander people were 6.5 times more likely than non-Aboriginal or Torres Strait Islander people to report dampness in their homes, 2.3 times more likely to report mould, twice as likely to report pests, and 1.5 times more likely to report using unflued gas heating. This is important to consider alongside the known health and asthma disparities and inequities already faced by Aboriginal and Torres Strait Islander people. Aboriginal and Torres Strait Islander people experience poorer health outcomes than other Australians, including an overall burden of disease that is 2.3 times higher than non-Aboriginal or Torres Strait Islander people¹⁴ and asthma prevalence 1.6 times higher.¹⁵

- b. People with asthma were 1.4 times more likely than those without asthma to report mould and dampness in their homes, 1.5 times more likely to report pests, and 1.2 times more likely to report use of unflued gas heaters. Similarly, people with allergies were 1.7 times more likely to report mould and dampness, 1.5 times more likely to report pests, and 1.3 times more likely to report use of unflued gas heaters. Exposure to these triggers in the home not only worsens existing asthma and allergy symptoms, leading to poorer health outcomes, but can also contribute to the development of asthma in people who do not have it. It is possible that people with asthma and allergies, whose symptoms can be triggered by exposure, are more aware of the presence of mould and pests, leading to a higher reported prevalence.
- c. People living with children in the household were 1.4 times more likely to report presence of pests, 1.6 times more likely to report mould, and 1.7 times more likely to report dampness in their home than people without children in the home. People with children in the household were also 1.4 times more likely to report having gas cooktops. The implications of this are covered in key finding 4.
- d. People living in social housing were twice as likely as homeowners to report mould and dampness in their homes and 1.7 times more likely to report pests. This is significant because social housing providers have a responsibility to provide tenants with healthy, safe homes. Additionally, social housing tenants have limited autonomy and means to make changes to their homes. Social housing can and should offer healthy homes, especially for vulnerable tenants. Here we see these landlords, including state governments, falling short in this responsibility.

4 People with children in their household were more likely to report using gas cooktops, which can contribute to the development of asthma.

People living with children in their home, were 1.4 times more likely to report using gas cooktops compared to people without children in the home.

Exposure to emissions from gas cooktops has been associated with development of asthma in children. Cooking with gas is estimated to be responsible for up to 12% of the childhood asthma burden in Australia which is comparable to the risk of tobacco smoke exposure in the home.¹⁶

5 People who own their home or live in higher income households are more likely to report using wood heating and gas cooktops.

Households with higher incomes are more likely to report having gas cooktops in their home. People with household incomes of \$120,000–\$150,000 were twice as likely to report gas cooktops in their home compared to those earning less than \$40,000 a year. Similarly, people with household incomes of \$120,000–\$150,000 were 1.5 times more likely to report wood heater usage than those earning less than \$40,000 a year. These trends were also reflected among homeowners, compared to those renting or living in social housing.

This association indicates a need for greater awareness of the health and environmental impacts of gas cooktops and gas and wood heaters to encourage people in higher socioeconomic brackets to change to healthier forms of household heating and cooking. However, there is also a need for subsidy schemes to support low-income households to transition to healthier forms of heating and cooking.

6 Australians prefer to use gas cooktops, despite the adverse health and environmental impacts.

Gas cooktops are the preferred cooktop for many Australians (45%), despite the adverse health and environmental impacts. Most people who preferred gas cooktops reported this was because they preferred gas cooktops for cooking (71%). Overall, Australians are primarily choosing their cooktops based on cooking preferences, ease of cleaning and affordability, rather than health or environmental concerns.

Health and environmental considerations did not rank highly, regardless of the preferred type of cooktop. Only 15% of overall respondents cited their preference was due to health reasons and 14% noted environmental reasons. However, people who preferred electric or induction cooktops were more likely than people who preferred gas cooktops to acknowledge their preference was due to the potential health and environmental benefits.

These findings suggest a need for greater awareness of the health and environmental implications of gas emissions in the home. Only one quarter of Australians (25%) recognised that exposure to gas from cooking or heating can be a trigger for asthma. Additionally, despite most people (91%) reporting they use their exhaust fan, open windows, or use an air purifier while cooking; one quarter of respondents (23%) said they are not concerned or worried about taking actions to reduce cooking smells, smoke or moisture. This also suggests a need for greater awareness as using certain cooking methods with any type of cooktop can produce pollutants or condensation.

7 Many Australians would prefer to use efficient heating systems but are restricted by cost and having limited autonomy to make changes in their homes.

Half of Australians (47%) would prefer to have reverse cycle/split system or central/ducted heating systems, which are considered more efficient.

However, of the 43% of respondents who do not currently have their preferred form of heating, many face barriers to switching. Nearly half (43%) reported they are unable to change due to the cost of replacing their heating system, and one third (34%) are unable to because they do not own their home.

It is important to note that exposure to cold temperatures is a significant asthma trigger, as is exposure to heat, however these risks were outside the scope of this analysis.

8 Nearly all Australians are taking regular action to reduce, prevent or avoid exposure to mould in their homes, particularly population groups who were more likely to report the presence of mould.

Nearly all Australians (89%) are taking regular action to reduce, prevent or avoid exposure to mould. Most commonly, people are opening windows and using fans in bathrooms or while cooking. One in ten people are also using additional appliances such as air purifiers (11%) and dehumidifiers (8%).

Population groups who were more likely to report the presence of mould were also more likely to report taking regular actions to reduce, prevent or avoid exposure. In particular:

- Aboriginal and Torres Strait Islander people were 1.7 times more likely to take action than non-Aboriginal or Torres Strait Islander people,
- People with asthma were 1.7 times more likely and people with allergies were twice as likely to take action as those without asthma or allergies, and
- People with children in the household were 1.3 times more likely to take action than those without.

Other groups more likely to take action included people with higher education levels and people living in higher-income households.

The high proportion of people taking action is likely to reflect widespread awareness that exposure to mould can cause health problems. Seven out of 10 respondents were aware that mould is a trigger for asthma.

However, it is also worth noting this survey was conducted during heavy rainfall events, particularly in New South Wales and Queensland, which may have led to higher awareness and action.

9 Most Australians are taking regular action to remove, prevent or reduce pests in the home, particularly population groups who were more likely to report the presence of pests.

Most participants (71%) reported they had taken at least one action against pests in the last 12 months. Most commonly, people reported removing rubbish regularly, vacuuming the house, not leaving food out and washing sheets and pillowcases. Half of all respondents (48%) reported using household pest control products.

Population groups who were more likely to report the presence of pests were also more likely to report taking regular actions to reduce, prevent or avoid exposure. In particular:

- People living in social housing were 1.6 times more likely to take action than homeowners,
- Aboriginal and Torres Strait Islander people were 4.2 times more likely to take action than non-Aboriginal or Torres Strait Islander people,
- People with asthma were 2.6 times more likely and people with allergies 3.3 times more likely to take action than those without asthma or allergies, and
- People with children in the household were 1.3 times more likely to take action than those without.

Older people, people in higher income households and people living in major cities were also more likely to take actions to remove, reduce or prevent pests in the home. The high proportion of people taking action against pests is reassuring, given 70% of Australians reported pests in their home in the last 12 months.

10 Many Australians face barriers to making changes and improving their indoor air quality.

Only 6 out of 10 Australians said they are confident to make changes to improve the air quality inside their home. A similar proportion (56%–61%) reported facing at least one barrier to reducing their exposure to emissions from gas heaters, mould and pests. Common barriers reported by respondents included:

- a. The cost of taking action to reduce triggers or exposure to triggers was prohibitive for many Australians. One quarter of Australians (25%) said that it is too expensive to purchase or use equipment, like air purifiers, to take action while cooking or against mould and pests. For 15% of Australian the cost of professional pest treatment was prohibitive.

Among those who do not have their preferred heating or cooktop type, 47% said the cost of replacing it was a barrier for them.

Some participants described the difficulty of taking action while facing the increased cost of living or living on low incomes, and that many of these actions are secondary to their everyday living costs.

"I have budget limitations to install some items that would help (e.g. a fan in the bathroom and exhaust for rangehood). **I would like to buy an air purifier but** again have no budget with rising interest rates and cost of living."

"I would like to change my gas stove to electric but too expensive. **I don't understand why it's so expensive** especially having children in the house I find electric is easier and safer for the family."

- b. Many participants faced a lack of autonomy over their property or had to rely on improvements being made by their landlords, real estate agents or social housing providers. This was described in open text responses, particularly frustration with a lack of action or concern about requesting changes in case of rent increases or eviction.

One fifth of respondents (21%) said they were unable to make changes to protect themselves from emissions while cooking, or to prevent, reduce or remove pests and mould, because they do not own the property. Among respondents who are renting or live in social housing, 49% reported this.

Additionally, among those who do not have their preferred heating or cooktop type, 34% of all respondents said this is because they cannot make changes to the property. Among only those who rent or live in social housing, three quarters (74%) said not owning the property was a barrier to them changing their heating or cooktop.

"I live in a rental, and they are terrible at doing any sort of maintenance, and so **I feel like they would penalise me if I mentioned potential mould.**"

"Because I rent **getting anything done requires getting permission first**, which then takes a long time, as the landlord doesn't get things done quickly, if at all, and is VERY tight with her money, and being on a disability pension makes it nigh on impossible to afford anything myself, so **I just have to make do**, with everything that happens, even more so now, with the way the rental market is."

- c. A significant proportion of Australians lack concern or awareness about the potential health implications or knowledge of what to do to protect themselves.

Overall, 38% of participants said they are not worried or concerned about taking action against at least one of the triggers. This was highest for taking action to reduce exposure to emissions while cooking, with one quarter of respondents (23%) saying they were not worried.

Almost one fifth of respondents (18%) reported they do not know what to do to protect themselves against at least one of the triggers, with the highest being taking action against mould (12%).

Additionally, there was a lack of understanding among all Australians about the potential impacts of some of these triggers for people with asthma or allergies. Only one quarter recognised gas emissions and 39% recognised pests as a trigger for asthma, compared to 70% of respondents who recognised mould as a trigger for asthma.

"I googled for help for mould but **the advice is mixed** and doesn't seem thorough. Most of the advice is temporary light touch things like using vinegar. But the mould keeps coming back. There are lot of businesses but they don't seem to have a licensing scheme so **I have no idea who to trust** and who is just selling snake oil."

"Sometimes it's that **I didn't realise some things could cause problems**, such as drying clothes indoors, I haven't had a choice lately, but if that encourages mould now I am nervous."

"Sometimes, it is just **a lack of knowledge** as to the best way to control an issue, or to even realise something could be an issue."

- d. Other barriers reported by participants included difficulty taking action due to physical disabilities, illness or injury; outdoor air pollution outside of their control entering the home; pests being more common in rural or regional areas; lack of time; and concern about use of cleaning or pest control products.

11 Certain population groups are more likely to report barriers to taking action to reduce exposure to gas emissions, mould and pests.

- a. People who live in social housing were more than twice as likely as homeowners to report barriers to taking action on cooking, mould and pests. Similarly, renters were 1.6–2 times as likely to report barriers compared to homeowners.

People living in social housing or renting were also less likely to have a rangehood which works or vents air outside the house.

People renting and living in social housing have a limited ability to make the changes they would like to their homes. People articulated the challenges they face getting landlords and housing departments to take action, feeling unsupported by their landlords, and anxiety about rent increases or eviction if they complain.

“It is difficult with the current rental situation to get the landlord to make changes to the home. If we complain too much we will get evicted.”

“I am in a government property. I am not allowed to install things into the property and have to get approval. My requests have been declined because it is seen as not required/unnecessary, and I’m told I just have to clean more.”

- b. People living in households with an annual income of less than \$40,000 were more likely to report barriers to taking action, particularly for cooking and pests. Lower income households were likely to note the cost of purchasing and using equipment, and not owning their own home as a barrier.
- c. Aboriginal and Torres Strait Islander people were 1.5–1.8 times more likely to report barriers to taking action on cooking, mould and pests.
- d. People with asthma and allergies were 1.3–1.4 times more likely to report barriers to reducing exposure to gas emissions, mould and pests.
- e. Younger people were more likely to report barriers to taking action on cooking, mould and pests. The likelihood of reporting barriers to taking action decreased with age. In particular, younger people were more likely to report they don’t know what to do or don’t have time to take action, than older Australians.
- f. People were more likely to report facing barriers with increasing education levels. People with a bachelor’s degree or above were at least 1.3 times more likely to take action on cooking, mould and pests than people whose highest level of education was year 12 or below.

In some cases, these population groups, in particular low-income households, renters and people living in social housing, face systemic and structural barriers that prevent them from taking action. Additionally, most of these population groups were also most likely to report having triggers in their home. Given the greater prevalence, they may be more conscious of reducing the triggers or their exposure, and therefore more likely to be aware of barriers which prohibit them from acting.

12 People who own their home and people without asthma are less likely to be worried about exposure to pests, mould and emissions from cooking.

People who own their home were less likely to report being concerned or worried as a barrier to taking action on cooking, mould and pests compared to people who rent or live in social housing. This reflects people who own their home having a greater autonomy over their housing conditions.

Similarly, people without asthma were less likely to report being concerned or worried about taking action on cooking and mould compared to people with asthma. This may be due to people without asthma not experiencing immediate respiratory symptoms as a result of exposure to emissions from cooking or mould, and therefore being less aware of and concerned about the health impacts.

POLICY IMPLICATIONS



Financial support for low-income households seeking to improve home health, focusing on priority populations, which could contribute to the costs of:

- Transitioning to healthy and efficient heating and cooking including reverse cycle air conditioning, induction cooktops and efficient rangehoods
- Installing solar power and batteries
- Purchasing air purifiers
- Energy used to run electric home appliances



Investment in improving the health of existing social housing stock, which could include:

- Transitioning to healthy and efficient heating and cooking including reverse cycle air conditioning, induction cooktops and efficient rangehoods
- Installing solar power and batteries



Improving standards for new homes, which could include:

- Increasing thermal efficiency
- Transitioning towards electrification of new homes
- Installing solar power and batteries



Education programs to improve understanding in the general population and priority populations around home health, which could cover:

- Health risks associated with the home environment
- Preventing or reducing mould and pests
- Reducing exposure to emissions from cooking or heating
- How to choose a healthy home to rent or buy



Incentives for landlords to improve the health of private rental homes, which could reduce the costs associated with:

- Transitioning to healthy and efficient heating and cooking including reverse cycle air conditioning, induction cooktops and efficient rangehoods
- Installing solar power and batteries

This research reveals the need for a range of policy measures to improve the health of Australian homes. Asthma Australia has identified these key areas for reform and seeks to engage with stakeholders to identify and advocate for specific policy asks.

Beyond these key areas for policy reform, Asthma Australia recognises that homes are a critical consideration in addressing the climate crisis. Australian homes both contribute to greenhouse gas emissions and serve as spaces where people can shelter during climate-driven events such as bushfires and floods.

This is particularly important for people vulnerable to triggers from these events and triggers inside homes, including people with asthma and allergies. Australian homes not only present an opportunity for emissions reduction but also a priority for climate adaptation action.

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