

# Cooking Up Good Air Quality for Better Wellbeing



## Project Report

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The project team would like to express their gratitude to all participants who helped shape this project and to the stakeholders particularly EYST, Cardiff Council and the Welsh Government.

For Further information about the project, follow the link:

<https://orca.cardiff.ac.uk/id/eprint/171965>



## Introduction

This EPSRC-funded project explores the impact of cultural practices on indoor air quality (IAQ) in ethnic minority households, focusing on health and wellbeing. The project aligning with previous research found that cooking and current practices in the ethnic minority homes often lead to higher CO2 levels than in native-British households, especially in energy-efficient, '2050-ready' homes, where airtightness can worsen IAQ. Hence, further considerations are required to enhance the indoor environmental quality while sustaining occupants' cultural identity.

A key outcome is the creation of the 'Good Practice Guide' developed with Council housing residents of ethnic minorities, the Youth Support Team Wales (EYST), Cardiff Council, and the Welsh Government. The guide offers culturally sensitive advice and recommendations for residents and decision-makers to improve indoor air quality and enhance living conditions.

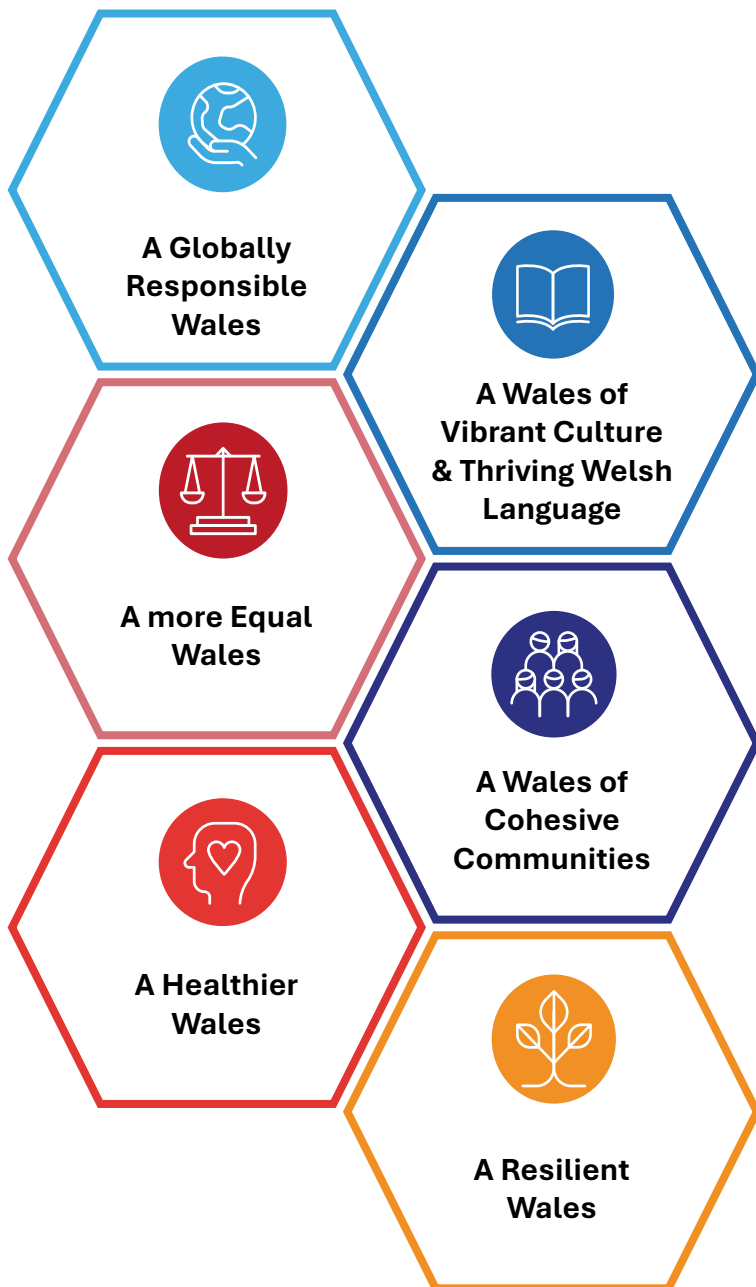
Particularly, the project focuses on raising awareness through outreach and engagement with local residents, ensuring ethnic minority communities and housing associations are informed about practical strategies for better wellbeing. The outcomes of the project align with the Welsh Housing Quality Standard (WHQS), promoting net-zero lifestyles, as well as to its alignment with the Wellbeing goals of the Future Generations (Wales) Act, fostering a healthier, and more sustainable future.

## The Welsh Housing Quality Standard

This project worked with tenants of social homes in Cardiff whose homes are covered by the Welsh Housing Quality Standard (WHQS) 2023. Therefore, the research has been considered in the context of the WHQS which specifies that homes must have modern kitchens with appropriate ventilation systems, ensuring both safety and comfort. Proper ventilation, particularly in kitchens and bathrooms, is crucial for maintaining good indoor air quality, helping to prevent issues such as damp, mould, and harmful emissions like carbon monoxide.

By ensuring that kitchens are equipped with mechanical ventilation and incorporating whole-house mechanical ventilation where necessary, the standard aims to enhance air circulation and reduce indoor pollutants. This focus on air quality has a direct impact on residents' wellbeing, promoting healthier living environments, reducing respiratory problems, and fostering a more comfortable home.

Furthermore, the WHQS's commitment to energy efficiency through effective ventilation and heating systems also contributes to lowering energy costs and minimising environmental impact, supporting broader efforts to enhance the overall quality of life for residents in Wales by creating healthier and more resilient homes that are fit for the future.



## Wellbeing of Future Generations Act

The development of this project has been strongly influenced by the values outlined in the Welsh Government's Well-being of Future Generations (WFG) Act and its goals. The research worked with ethnic minority communities, community centres, and Welsh governmental bodies, to help create a prosperous Wales with resilient, cohesive, and healthy communities. The WFG goals have been used to allow the voices of the tenants to speak directly to the policies of the Welsh Government. This process was valued by the tenants who felt their voices could be heard more clearly by the landlords and policy makers involved.

By addressing indoor air quality (IAQ) in ethnic minority households, it aligns with several key goals of the Act. The project promotes a healthier Wales by enhancing physical wellbeing through improved IAQ and contributes to a resilient Wales by encouraging sustainable, energy-efficient living practices.

This project emphasises how community-driven initiatives, rooted in grassroots efforts, reflect the values of the Wellbeing of Future Generations Act. It highlights the influence of these efforts on decision-makers, ensuring that solutions are inclusive and responsive to community needs, ultimately supporting the Act's goals of fostering a more sustainable and equitable future for all.







**A Globally  
Responsible  
Wales**



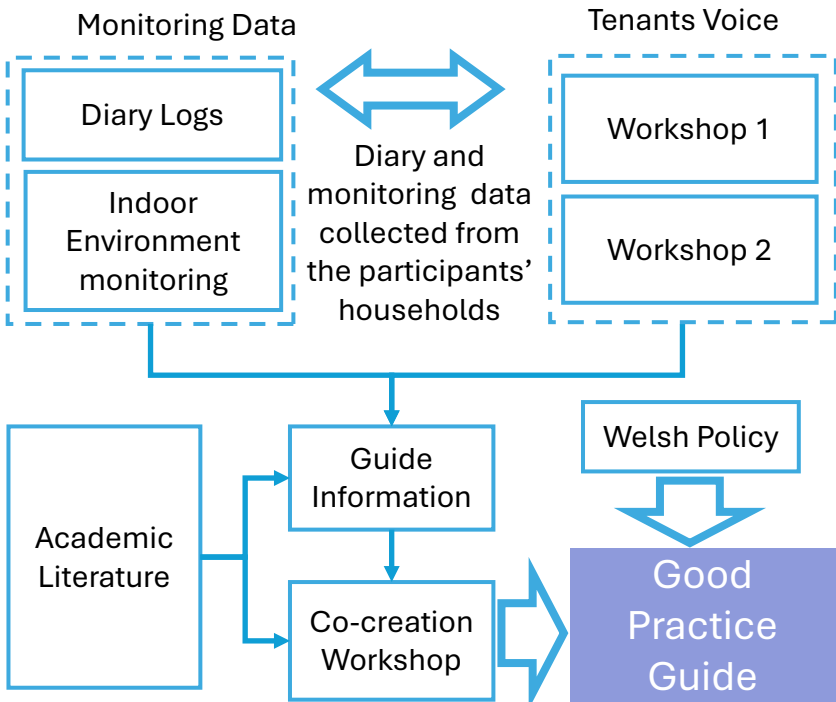
## About The Project and Guide

Cooking, particularly in ethnic minority households where traditional methods are integral to cultural heritage, can significantly impact indoor air quality due to the release of pollutants like Particulate Matter (PM), Volatile Organic Compounds (VOCs), Carbon dioxide (CO<sub>2</sub>), Carbon monoxide (CO), and Nitrogen Oxides (NO<sub>x</sub>). Emission levels vary by cooking method and stove type, with frying, grilling, and the use of gas or solid fuel stoves posing higher health risks. These pollutants are associated with respiratory and cardiovascular issues, including asthma and cancer. This project, along with its Good Practice Guide, offers practical solutions to improve indoor air quality in kitchens, especially in ethnic minority homes.

Adequate ventilation is essential for reducing cooking-related pollutants in the kitchen. Using exhaust hoods, ensuring good airflow, and regular cleaning of surfaces and cookware can significantly lower pollutant levels. The Good Practice Guide from this project provides strategies to improve ventilation, adopt safer cooking practices, and maintain a clean kitchen while respecting traditional cooking methods.

# Guide Development

The study employs a multi-step methodology integrating qualitative and quantitative data with academic research to develop a Good Practice Guide for improving indoor air quality. It begins with two workshops to gather tenants' experiences and concerns, complemented by monitoring data from diary logs and air quality monitors. This data is then analysed alongside academic literature to create preliminary guide information, which is further refined through a third workshop. The final output is a comprehensive Good Practice Guide that balances cultural traditions with practical solutions for healthier indoor environments targeting residents and landlords.







A more Equal and  
Culturally Vibrant  
Wales



## Collaborators

A key feature of this EPSRC IAA project was the collaboration with the Ethnic Youth Support Team Wales (EYST Wales), known for its strong connections with ethnic minority families in Wales. We also worked closely with Cardiff Council, home to many ethnic minority households. Partnering with the Welsh Government allowed us to explore how our 'good practice guide' and resources could be expanded to other housing associations using a Living Lab and participatory approach. This collaboration supported the **Welsh Government's Welsh Housing Quality Standard (WHQS)**, the Wellbeing of Future Generations Act, and their commitment to climate change adaptation and net-zero lifestyles. Importantly, it enabled an inclusive, bottom-up approach, empowering local residents from ethnic minority communities to actively participate in decision-making while improving their Wellbeing.



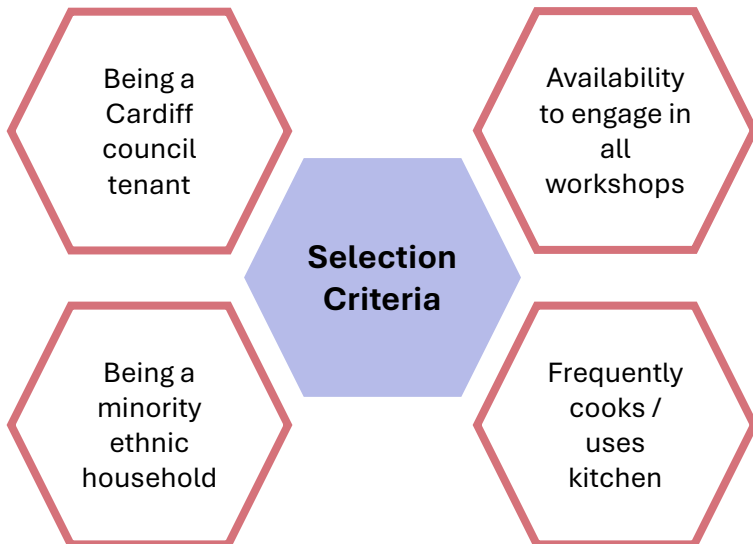


## Recruiting the participants

### Methodology

In collaboration with Cardiff Council's Energy Efficiency and Sustainability Division, invitation letters to the participants were sent to invite them to participate in the Project if they meet the selection criteria.

Furthermore, many of the participants were engaged in the project and invited their neighbours and friends whom it fitted the criteria to be part of the project.









# A Wales of Cohesive Communities



## Engagement Workshops

A series of meticulously designed workshops was developed in collaboration with EYST-Wales and Cardiff Council to raise awareness about the impact of indoor air quality on the wellbeing of ethnic minority households.

These workshops, using a co-design, bottom-up approach, created a safe space for participants to share their experiences through roundtable discussions, contributing to the development of a Good Practice Guide. This guide provides practical recommendations tailored to various stakeholders, including residents and landlords, ensuring that community voices and needs are central to improving housing conditions in Wales.

Each workshop systematically advanced participants' understanding and engagement with indoor air quality issues, resulting in practical guidance tailored to their needs. The collaborative design of the Good Practice Guide was a key achievement, driven by the insights and behavioural patterns identified during the workshops.



## Engagement Workshops

The workshops were designed to raise awareness about indoor air quality and its effects on the health and wellbeing of ethnic minorities.

**The first workshop** introduced the concept of IAQ, assessed participants' knowledge by sharing the findings of recently completed research through film and comparative analysis of kitchens in White British and Ethnic minority homes, and explored their cooking habits through diaries. Participants were shown how to log daily behaviours that could influence air quality in their homes.

**The second workshop** reviewed the diary logs and discussed the relationship between cooking behaviours and IAQ. This process empowered participants to identify changes to improve ventilation, cleanliness, and cooking practices, enhancing their air quality and overall wellbeing. This workshop is the key focus of this project.

**The co-creation workshop** focused on co-designing a Good Practice Guide, incorporating feedback from the earlier sessions. It highlighted practical steps to improve ventilation, maintain cleanliness, and increase cooking efficiency tailored to participants' home environments.



Group number: 3

Wednesday 20-3-2024

<p>Garden</p>	<p>to look at opening to Big garden to garden house</p>	<p>to look at opening to Big garden to garden house</p>	<p>to look at opening to Big garden to garden house</p>
<p>Living Area</p>	<p>to look at opening to Big garden to garden house</p>	<p>to look at opening to Big garden to garden house</p>	<p>to look at opening to Big garden to garden house</p>
<p>Kitchen</p>	<p>to look at opening to Big garden to garden house</p>	<p>to look at opening to Big garden to garden house</p>	<p>to look at opening to Big garden to garden house</p>
<p>Bathroom</p>	<p>to look at opening to Big garden to garden house</p>	<p>to look at opening to Big garden to garden house</p>	<p>to look at opening to Big garden to garden house</p>
<p>Scenarios</p>	<p>How would you feel?</p>	<p>Why did you feel like this?</p>	<p>What would you change?</p>
<p>How would you describe the air in these places?</p>			

Engineering and Practice Research Centre  
UKRI-IAA Project: Good practice guide to raise awareness of indoor air quality on the health and well-being of ethnic minorities.

Rituals in the kitchen, making your favourite dish

Workshop Activity 2  
Wednesday 20-3-2024

Meats: Add yours

Vegetables: Add yours

Rice: Add yours

Seasoning: Add yours

Cutting: Add yours

Boiling: Add yours

Over Baking: Add yours

Preparing: Add yours

Opening Window: Add yours

Closing Kitchen: Add yours

Closing Window: Add yours

Washing Dishes: Add yours

Mopping Floor: Add yours

Enjoying the meal

UKRI-IAA Project: Good practice guide to raise awareness of indoor air quality on the health and well-being of ethnic minorities.

## Understanding Indoor Air Quality

Rituals in the kitchen, making your favourite dish

Workshop Activity 2  
Wednesday 20-3-2024

Meats: Add yours

Vegetables: Add yours

Rice: Add yours

Seasoning: Add yours

Cutting: Add yours

Boiling: Add yours

Over Baking: Add yours

Preparing: Add yours

Opening Window: Add yours

Closing Kitchen: Add yours

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Washing Dishes: Add yours

Mopping Floor: Add yours

Enjoying the meal

UKRI-IAA Project: Good practice guide to raise awareness of indoor air quality on the health and well-being of ethnic minorities.





# Workshop 1

Activity	Anticipated Objectives
<b>Behaviour in the kitchen map</b>	<ul style="list-style-type: none"><li>• Understand participants' current knowledge of indoor air quality (IAQ).</li></ul>
<b>Rituals in the Kitchen</b>	<ul style="list-style-type: none"><li>• Explore participants' diaries regarding cooking activities.</li><li>• Explain the diary log and how to fill it.</li></ul>

## Workshop summary

The workshop explored participants' understanding of indoor air quality (IAQ) and their cooking routines through diary logs. Discussions highlighted the need for better ventilation, including more windows and bifold doors. Air quality was described in varied terms, and cleanliness was emphasized through regular kitchen cleaning. Cultural practices also influenced participants' daily cooking routines, integrating social elements into their kitchen habits.



# Highlighting The Problems – Proposing Actions

Behaviour in the kitchen map Workshop (2) Activity (1)

Name: *Ahaz* *trish A* Wednesday 1-5-2024

What was I feeling?		<input type="checkbox"/> Add your own
How would I describe the air?		<input type="checkbox"/> Add your own
What was I doing?		<input type="checkbox"/> Add your own

*Handwritten notes on the map:*  
 - Red lines connect 'Disgusted' to 'No Feeling' and 'Annoyed' to 'No Feeling'.  
 - A red circle highlights 'Humid' and 'Dry' with the handwritten note 'Savannah coffee'.  
 - A red circle highlights 'Hot' and 'Cold' with the handwritten note 'Hot food'.  
 - A red circle highlights 'Boiling' with the handwritten note 'milk'.  
 - A red circle highlights 'Nothing' with the handwritten note 'the window'.



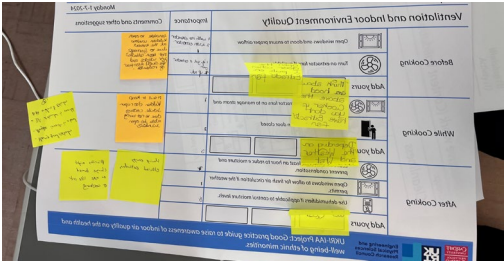


## Workshop 2

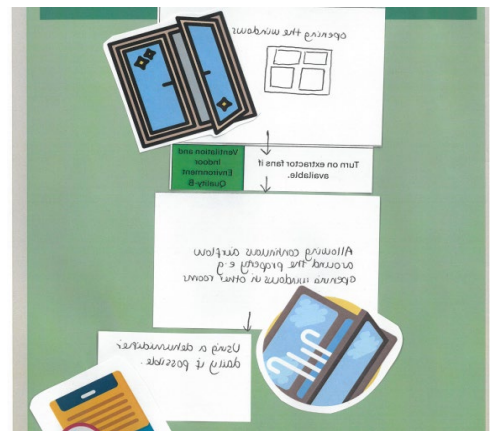
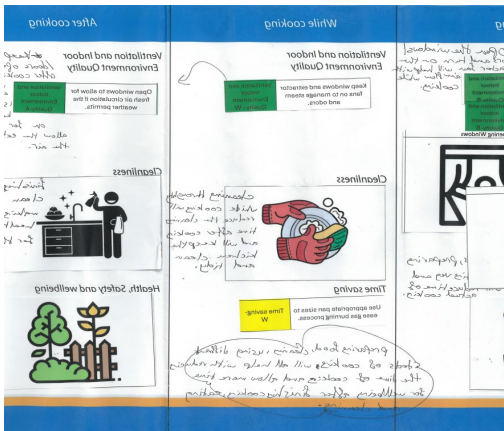
Activity	Anticipated Objectives
<b>Behaviour in the kitchen map</b>	<ul style="list-style-type: none"><li>• Explain the relationship between cooking behaviour and IAQ and how that will affect the occupants' Wellbeing.</li></ul>
<b>PART 1: Activities in the Kitchen Affecting Indoor Air Quality</b>	<ul style="list-style-type: none"><li>• Work with the participants on finding behaviour modifications to enhance IAQ.</li></ul>
<b>Part 2: what do you think should be done to enhance your experience in the kitchen</b>	

### Workshop summary

The workshop explored how kitchen behaviour affects indoor air quality (IAQ) and wellbeing. Participants suggested improvements in ventilation, cleanliness, and cooking efficiency. Key observations included actions like opening windows and using extractor fans, with varied individual responses to air conditions.



# Together, Working on building a healthier and more resilient Wales







## Co-Creation Workshop

Activity	Anticipated Objectives
<b>Collective work (Content Validation)</b>	<ul style="list-style-type: none"><li>• Validate the content of the Good Practice Guide</li></ul>
<b>Collective work (Visual Validation)</b>	<ul style="list-style-type: none"><li>• Collectively design the Good Practice Guide draft ensuring its readability and accessibility.</li></ul>

### Workshop summary

The workshop focused on validating both the content and design of the Good Practice Guide. In the content validation session, informed by previous workshops' outcomes and a cross-analysis of academic literature, participants stressed the importance of improved ventilation, cleanliness, time-saving in cooking, and addressing gas and electric cooktops for better kitchen efficiency. During visual validation, participants preferred abstract visuals and recommended a concise leaflet version of the guide, with a more detailed booklet available for further reference and comprehensive understanding.





**A healthier and  
resilient Wales**



## Monitoring Data And Diary Logging

This project supports the Welsh Government's efforts to contribute to a globally responsible Wales by advocating for a more resilient Wales and promoting a healthier environment. Alongside the participatory workshops, a scientific approach was integrated into the project by monitoring temperature, relative humidity, and carbon dioxide levels in all participants' houses as case studies from the project.

This data collection aims to understand residents' behavioural patterns and raise awareness of the importance of good kitchen air quality. This approach was grounded in previous research and literature investigating indoor air quality and its impact on the well-being of occupants in residential buildings, mainly focusing on the harmful air pollutants from cooking.

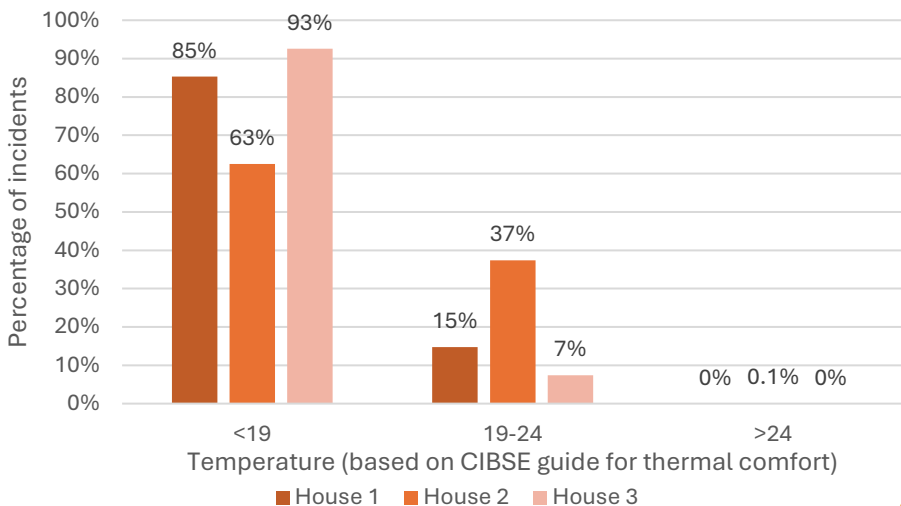
The monitoring results were shared with workshop participants to explain the quality of the indoor environment and highlight the positive and negative impacts of different kitchen practices.



## Indoor Air Temperatures

This study aimed to highlight the importance of indoor temperature for thermal comfort by monitoring the kitchens of participants' houses during occupancy hours, which were determined based on discussions with participants and their lifestyles (6 a.m. to 12 a.m.).

Following CIBSE guidelines, the analysis revealed that temperatures below 19°C occurred 31-93% of the time, while temperatures within the optimal range of 19-24°C occurred 7-69% of the time. These results emphasise the variation in indoor temperature across the monitored homes.

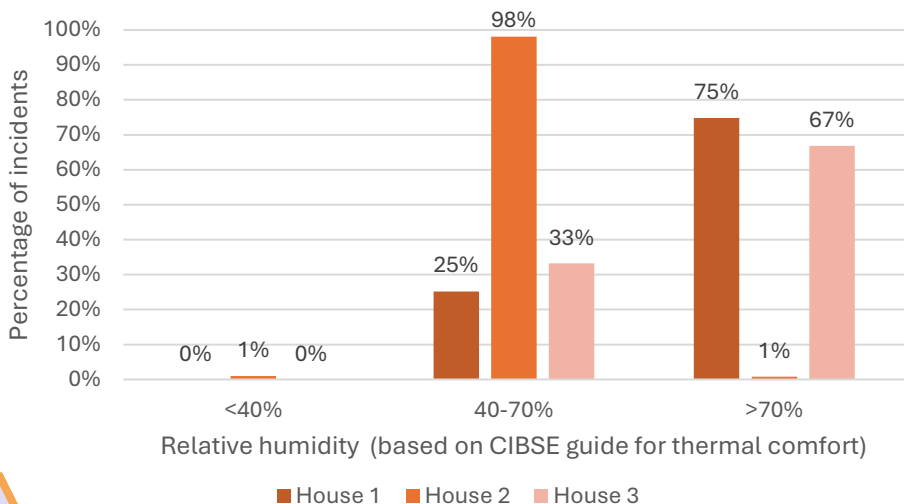




## Indoor Relative Humidity

The following chart shows an analysis focused on monitoring relative humidity in the participants' kitchens within the previously agreed occupancy hours (6 a.m. to 12 a.m.) to assess thermal comfort following CIBSE guidelines.

The findings showed that humidity levels below 40% were almost non-existent. In comparison, humidity within the optimal range of 40-70% occurred 21-98% of the time. However, humidity levels above 70% were observed most of the time in the majority of the monitored houses. This suggests that maintaining ideal humidity levels is challenging, potentially affecting thermal comfort and wellbeing in the kitchens.

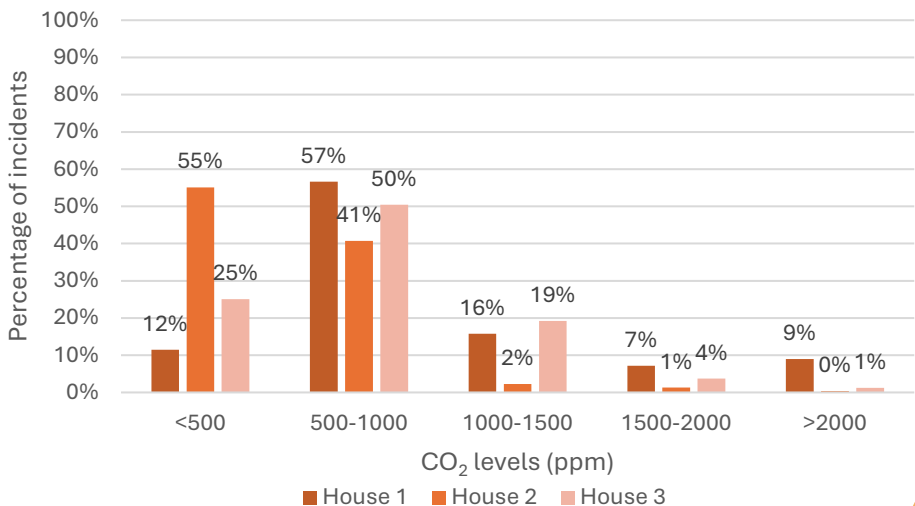




## Carbon Dioxide levels

Following the previous analyses of temperature and humidity, this part of the study examined CO<sub>2</sub> levels in the participants' kitchens during occupancy hours (6 a.m. to 12 a.m.). The results showed that CO<sub>2</sub> levels below 500 ppm were present at 12-55% across the three houses. CO<sub>2</sub> levels between 500-1500 ppm, which are generally considered acceptable, occurred 43-74% of the time. Notably, CO<sub>2</sub> levels between 1500-2000 ppm were detected 1-7% of the time, while levels exceeding 2000 ppm were rare, occurring less than 1% of the time in any house.

These findings suggest that while CO<sub>2</sub> levels were within acceptable ranges, occasional spikes above 1500 ppm could impact indoor air quality and occupant comfort.





## Integrating Behavioural Patterns with Monitoring Data

To examine the effect of behaviour patterns in the kitchen on indoor air quality, particularly carbon dioxide levels, participants were asked to record their activities in a kitchen diary for 28 days while cooking, with the first 14 days recorded before the second workshop, where the impact of cooking activities on indoor air quality and monitoring results were shared.

These diaries were analysed to identify associated activity patterns, which were then aligned with monitoring data to assess the impact of cooking and associated activities on indoor air quality. Additionally, the decay of CO<sub>2</sub> levels related to different ventilation patterns was calculated, and the effect of each activity was monitored over several hours.

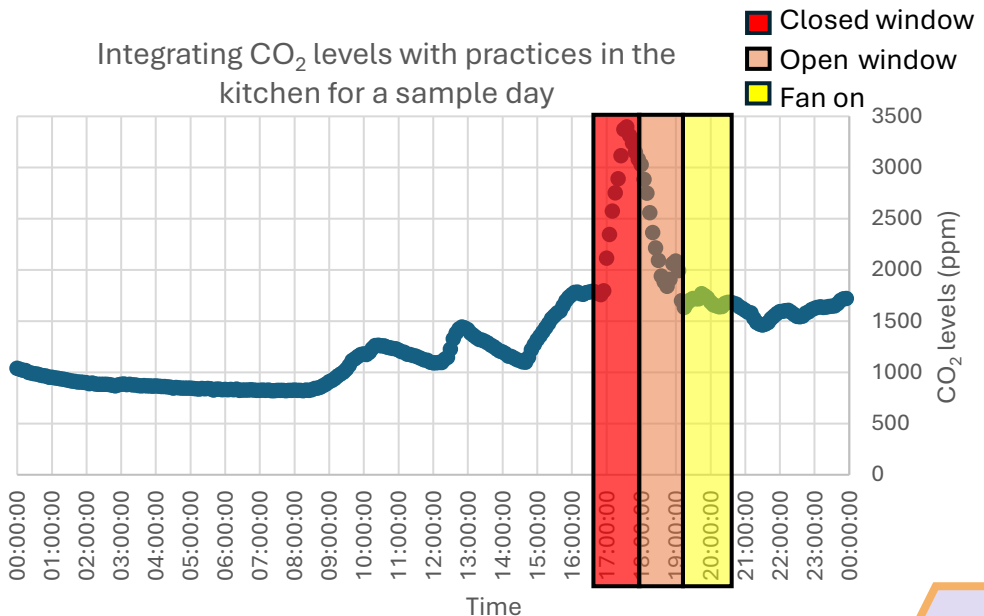
Finally, a quantitative analysis of ventilation activities mentioned in the diaries was conducted, followed by a comparative study of the monitoring data before and after the second workshop.





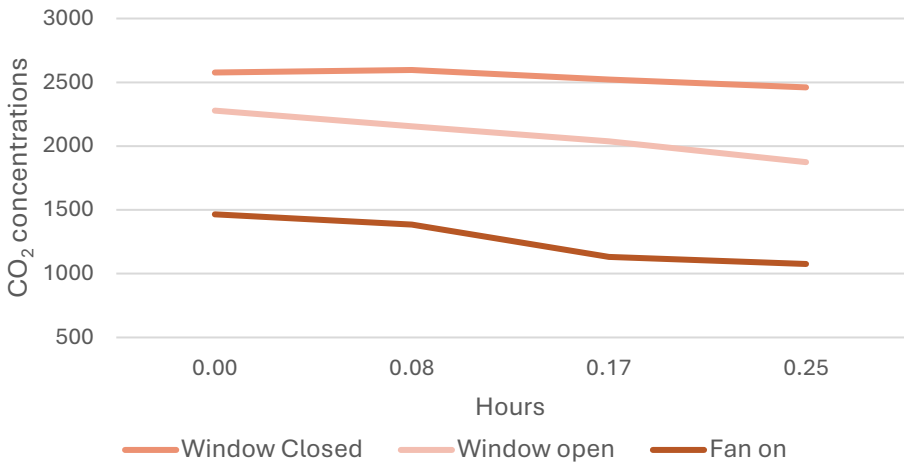
## Integrating Behavioural Patterns with Monitoring Data

The following chart shows carbon dioxide levels over time, with the red rectangle indicating poor air quality when windows are closed and fans are off, causing a sharp rise in carbon dioxide. The yellow rectangle presents improvement as opening the windows reduces carbon dioxide levels. The green rectangle shows further reduction when both windows are open, and extractor fans are switched on, effectively lowering carbon dioxide levels and improving indoor air quality. This highlights the importance of ventilation and fan use for improving air quality.





## Integrating Behavioural Patterns with Monitoring Data



The chart compares CO<sub>2</sub> decay over 15 minutes across three ventilation scenarios: windows closed, windows open, and fan on. With windows closed, CO<sub>2</sub> levels remain almost steady, dropping only slightly, indicating poor air exchange. When the windows are open, CO<sub>2</sub> levels decrease by about 200 ppm, showing moderate improvement in ventilation. The most effective scenario is with the fan on, where CO<sub>2</sub> levels drop by approximately 500 ppm, reflecting a much faster air exchange rate. This comparison highlights that while opening windows improves air quality, using a fan provides the most efficient method for reducing CO<sub>2</sub> levels and ensuring better ventilation.



## Integrating Behavioural Patterns with Monitoring Data

The air change rate (ACH) is the rate at which outdoor air replaces indoor air in a building, divided by its volume (Alavy, M., Li, T., & Siegel, J. A., 2018). The decay method from (Cui S. et al., 2015) calculates ACH by tracking how quickly CO<sub>2</sub> levels decrease without new sources.

CIBSE recommends 0.5 ACH for living spaces and 6-10 ACH for kitchens and bathrooms. This method helps evaluate ventilation strategies like open windows or fans to optimize airflow and meet healthy indoor air quality standards.

### Air Change Rate

Closed Windows	0.27
Open Windows	0.86
Fan on	1.35

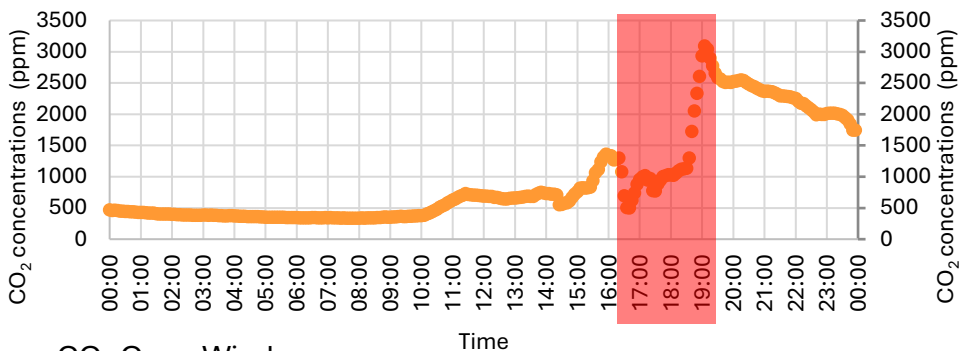
The table shows the calculated air change rates for each scenario. With windows closed, the rate is 0.27, indicating slow air exchange. Opening windows increases it to 0.86, over three times higher. Using a fan increases the rate to 1.35, five times higher, showing that fans are the most effective at reducing CO<sub>2</sub> and improving air quality.



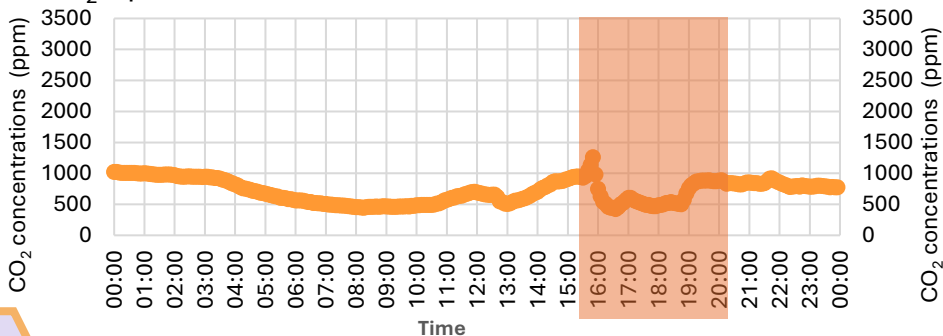
## Integrating Behavioural Patterns with Monitoring Data

The following charts show the impact of not opening a window on indoor CO<sub>2</sub> levels over several hours. When the window remains closed while cooking, CO<sub>2</sub> levels rise sharply, peaking at around 3000 ppm, and only decrease slowly to about 2000 ppm afterwards, indicating poor air quality due to lack of ventilation. In contrast, opening the window significantly drops CO<sub>2</sub> levels after cooking, quickly reducing them to around 700 ppm, which is considered a healthy level.

CO<sub>2</sub> Closed window



CO<sub>2</sub> Open Window

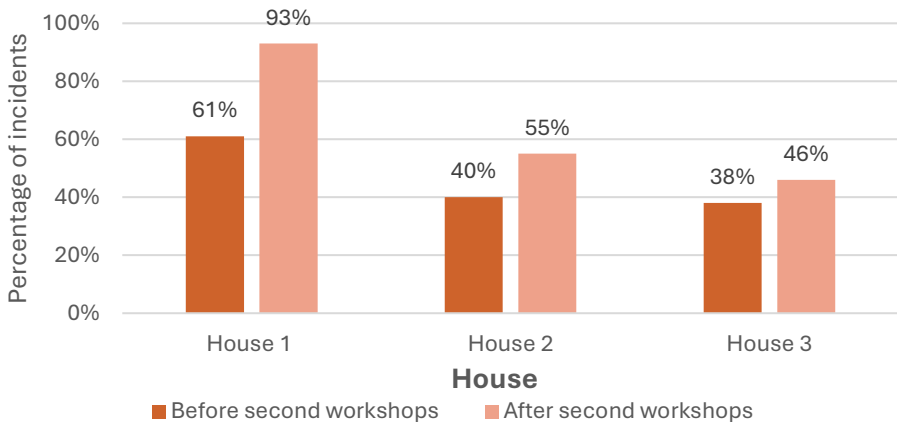




## Integrating Behavioural Patterns with Monitoring Data

The data shows a notable increase in ventilation mentions in participants' diaries after the second workshop. These changes suggest that the workshops effectively heightened participants' awareness and reporting of ventilation practices in their kitchens, highlighting the positive impact of educational interventions on improving indoor air quality management.

Ventilation Mentioned - Diary

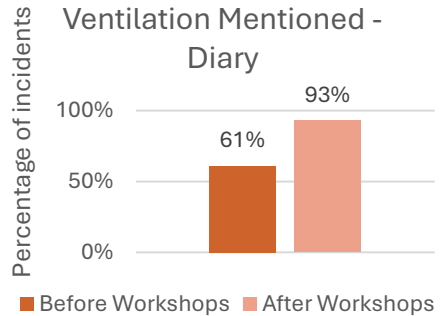


Overall, **18%** increase in mentioning ventilation in the participants' diary. This indicates that The workshops had a noticeable impact on the participants' awareness and discussion of ventilation, suggesting they became more mindful of indoor air quality after the workshops.

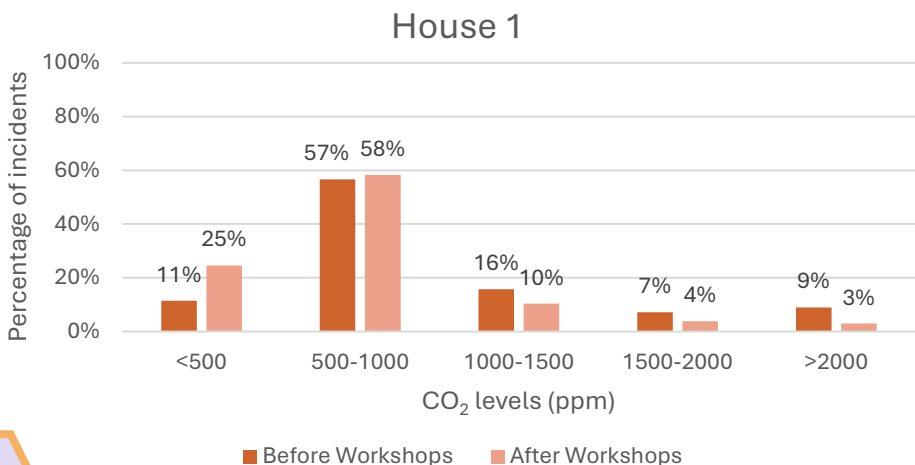


## Integrating Behavioural Patterns with Monitoring Data

There was a 32% increase in mentioning different ventilation strategies in house 1 diaries, which reflected on improving the healthier CO<sub>2</sub> levels in the house.

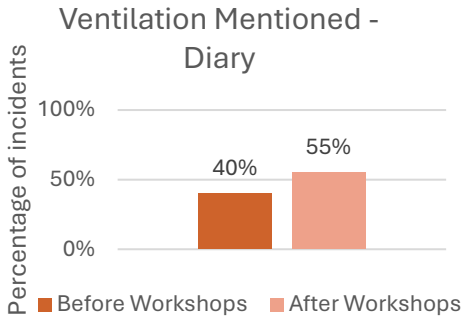


The chart shows CO<sub>2</sub> levels in House 1. Before the workshops, 11% of incidents had CO<sub>2</sub> levels below 500 ppm, increasing to 25% after the workshops, indicating a more significant presence of fresh air in the house. Furthermore, there were improvements in the higher CO<sub>2</sub> ranges. The monitoring results showed a drop of 15% in the unhealthy CO<sub>2</sub> levels.





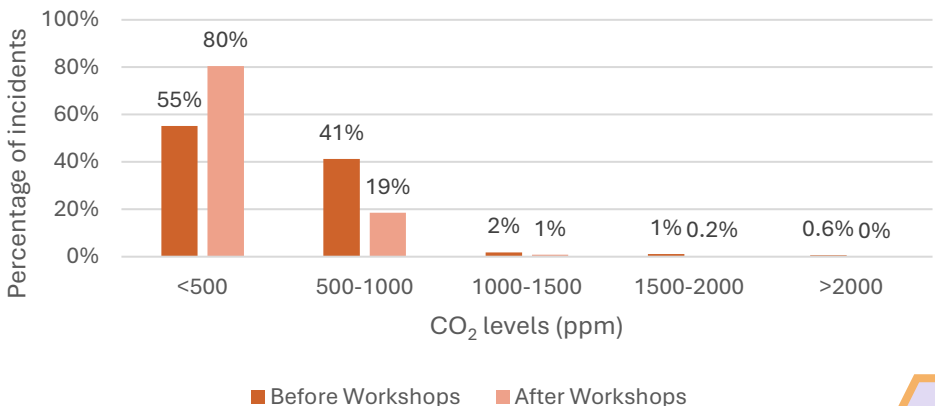
## Integrating Behavioural Patterns with Monitoring Data



The house 2 diaries show an increase of 15% in the incidents of ventilation strategies mentioned. This increase reflects raising the healthier CO<sub>2</sub> levels.

The chart shows CO<sub>2</sub> levels in House 2. Before the workshops, 55% of incidents had CO<sub>2</sub> levels below 500 ppm, increasing to 80% after the workshops. This indicates a more significant presence of fresh air in the house, with a 25% improvement rate. Moreover, it appears that the percentage of incidents with unhealthy CO<sub>2</sub> levels is insignificant.

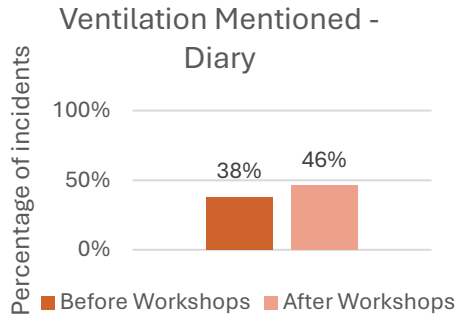
### House 2





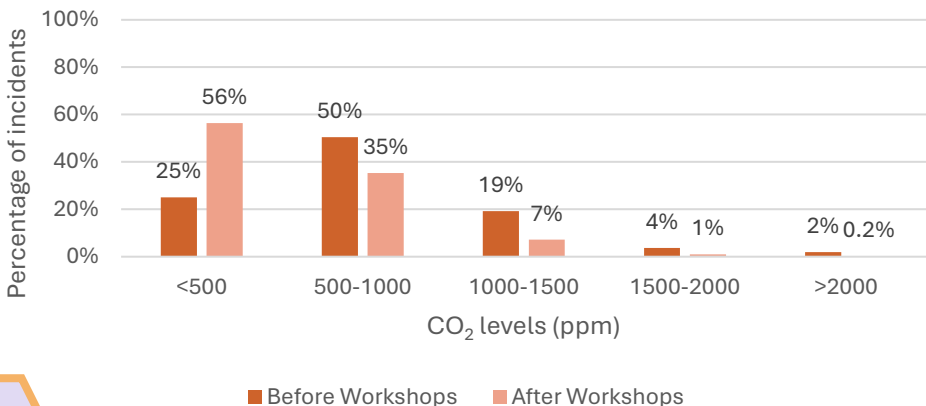
## Integrating Behavioural Patterns with Monitoring Data

The tenant's diary shows an 8% increase in mentions of ventilation strategies, which can be reflected in the decrease in unhealthy CO<sub>2</sub> levels.

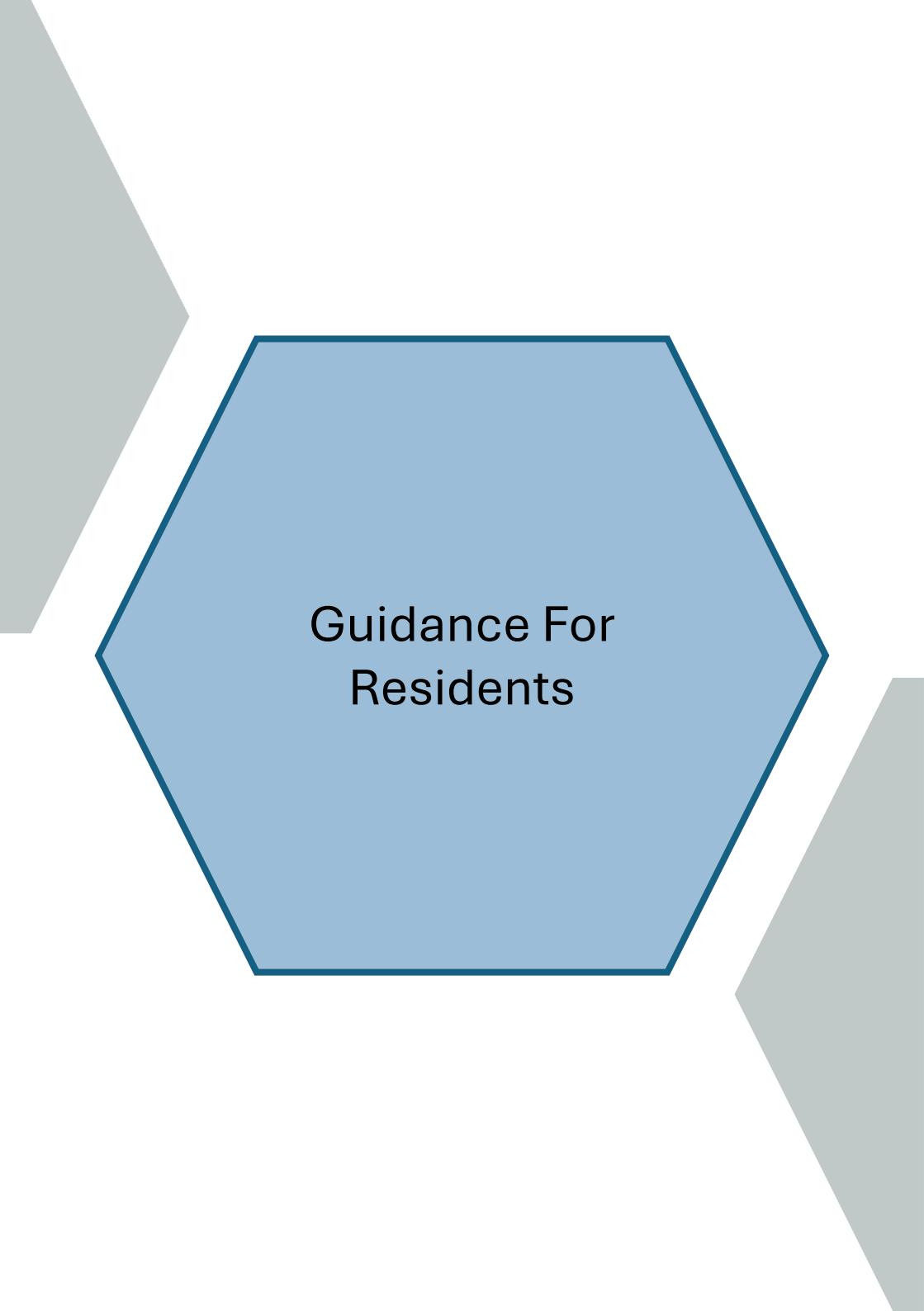


The chart shows CO<sub>2</sub> levels in House 3. Before the workshops, 25% of incidents had CO<sub>2</sub> levels below 500 ppm, increasing by 31% after the workshops, which would contribute to better indoor air quality. Additionally, improvements in the higher CO<sub>2</sub> ranges are evident. The monitoring results showed a drop of around 14% in the unhealthy CO<sub>2</sub> levels.

House 3



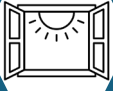




Guidance For  
Residents

# Before Cooking

## Ventilation and Indoor Air Quality



Open windows and external doors to ensure proper airflow



Turn on extractor fans if available.

**Also,  
Try to**

Consider daily ventilation for the kitchen, even if not cooking

### Fact

Cooking activities have demonstrated an increase in toxic gases such as Carbon Dioxide and Nitrogen Dioxide in kitchens. However, the use of extraction systems such as cooker hoods can support the reduction of such gases if well maintained and used effectively. (Kamilia N et al, 2022)

# Cleanliness

## Before Cooking



Ensure the cooking area is clean and free from clutter



*Remove food waste prior to starting cooking*



Wash hands thoroughly before handling food.

### Fact

Studies have shown a strong and evident correlation between the cleanliness of homes and the concentration of particulate matter in the air. Homes that are not cleaned regularly tend to have higher levels of particulate pollution, which can negatively impact indoor air quality. (Lee C, et al, 2002)

# Before Cooking

# Time Saving



Take out necessary cooking equipment (pans, chopping boards).



*Prepare all ingredients (chop vegetables, wash rice, prepare meat) before cooking.*

## Facts

- A study conducted to assess the cooking oil fume exposure impacts on Women's health have presented that middle-aged women, in particular, are more severely impacted than younger women, likely due to the cumulative effects of years of exposure (Yang K et al, 2022).
- The use of ventilation strategies while reducing exposure time to cooking oils and fumes can help reduce the negative impact on long-term health and wellbeing problems (Zhai, S. R., & Albritton, D, 2020)

# Ventilation and Indoor Air Quality

## While Cooking



Keep windows open and extractor fans on to manage steam and odors.



Keep the internal kitchen door closed



Open windows in adjoining rooms in open-plan kitchens and/ or the garden door to promote cross ventilation.

### Fact

The presence of a kitchen door can play a crucial role in reducing the distribution of particulate matter, effectively limiting its spread to other parts of the house and improving overall air quality. (Lie Q, 2022)

# While Cooking

# Cleanliness



Clean as you go



*Wash the dishes*

**Also,  
Try to**

Reuse some equipment while cooking.

## Fact

Cleaning could potentially improve indoor air quality by reducing airborne dust by up to 50%, decreasing airborne bacteria by 40%, and cutting airborne fungi by 61%, leading to a healthier and cleaner indoor environment (Farnki D L, et al, 1997).

# Time Saving

# While Cooking



Consider bulk cooking to save time and reduce fume exposure, such as preparing and refrigerating sauces in advance.



*Use the right pan size that matches the gas burner to improve the burning process.*

## Facts

Reducing the time spent in the kitchen while cooking can help maintain better health and wellbeing by reducing exposure to harmful fumes which are linked to respiratory issues, oxidative stress, and even increased risks of cancer, especially spending a lot of time cooking in poorly ventilated environments (Rim KT, 2023)

# After Cooking

## Ventilation and Indoor Air Quality



Leave fans on for a minimum of 10 minutes to reduce moisture and prevent condensation.



Keep windows open for at least 30 minutes to allow fresh air circulation

**Also,  
Try to**

Use dehumidifiers if applicable to control moisture levels.

### Fact

Using extractors can accelerate post-cooking pollutant decay, with particulate matter removal rates reaching up to 63%, resulting in shorter pollutant residence times. (Tang, R., & Pfrang, C., 2023)



# Cleanliness

## After Cooking



Wash all dishes and clean the kitchen thoroughly, including wiping down surfaces.



*Clear any remaining condensation from windows.*

### Fact

Studies that explored the relationship between cleanliness and indoor air quality have demonstrated that, without consistent and frequent cleaning, there is a marked increase in a particular type of airborne bacteria. This rise in bacteria can lead to significant adverse effects on both health and overall wellbeing. (Lee C, et al, 2002)


## Health, Safety & Wellbeing

For your wellbeing, if you don't need to be in the kitchen, relax by:

- *Reading a book*
- *Have a cuppa*
- *Light activities such as gardening*



Decorating your kitchen with indoor plants helps improve air quality by filtering pollutants and releasing oxygen. This creates a healthier environment that enhances physical and emotional wellbeing.



**Guidance and  
Recommendations  
For Decision Makers**



## Guidance For Residents

- Open windows and doors to ensure proper airflow from the beginning of the cooking process and leave it for a minimum of 30 minutes after cooking.
- Turn on Extractor fans if available from the beginning of the cooking process and keep it on for a minimum of 10 minutes after you finish cooking.
- Close Internal Kitchen doors.



## Guidance For Decision Makers

- Provide tenants' homes with operable and functional windows.
- Regular maintenance of the functionality of the windows.
- Provide tenant's homes with energy-efficient extraction fans to encourage tenants to use the fans effectively and efficiently.
- Regular maintenance and inspections for the extraction fans
- Ensure having doors that separate the kitchens from other spaces.



## Guidance For Residents

- Ensure all surfaces are clean and free from clutter.
- Wash hands thoroughly before handling food.



## Guidance For Decision Makers

- Regular inspection for cleanness in properties.
- Spread awareness of the implications of regular cleaning on wellbeing and air quality.
- Spread awareness of the implications of personal hygiene whilst cooking.

### Fact

Studies have shown that using non-chemical cleaning products can significantly reduce indoor pollutants and improve air quality, especially in kitchens. This is because conventional cleaners often contain volatile organic compounds (VOCs) that release harmful pollutants into the air during use (Carter T et al., 2024).



## Guidance For Residents

- Prepare all ingredients (chop vegetables, wash rice, prepare meat) before cooking.
- Take out necessary cooking equipment (pans, chopping boards).



## Guidance For Decision Makers

- Introduce training programs for efficient cooking practices.

### Fact

Studies have highlighted that some cooking practices can impact the respiratory and cardiovascular systems in our bodies than walking in a highly polluted area. This is due to the high amounts of indoor pollutants emitted while cooking. Therefore, research is emphasising on the importance of reducing the exposure to these pollutants on the health and wellbeing (Lachowicz J I et al., 2022).



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## Tenants Testimonies

“My participation in this project has made me feel more valued. I felt that my voice was heard.”

“participating in the project was a learning curve for me. I understood my kitchen environment and how it affects my wellbeing”

“I enjoyed the workshops, and I learned how to maintain the quality of my kitchen environment.”

“Before this project, I hadn’t realised how much cooking fumes could negatively impact my health. ”

“The project has enabled us to think differently about what we are doing, not just in the kitchen, but what we are doing in our house now; everything might impact.”