



From Occupant Behaviour to Lived Practice: Co-producing Ventilation Support for Healthier and More Equitable Homes

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SUMMARY

Residents experience indoor environmental quality (IEQ) through everyday practices, comfort, affordability and the usability of building systems—dimensions that measurements alone cannot fully capture. This paper examines how lived experience can be converted into practical evidence for healthier housing through two completed participatory projects in Welsh social housing. Both combined resident workshops, diaries and environmental monitoring with co-creation and stakeholder input. The first produced a culturally responsive Good Practice Guide for indoor air quality; the second developed a six-area diagnostic framework for damp, mould and ventilation. Together, the projects show how resident knowledge can reveal when, why and for whom indoor environmental problems occur, supporting practical household guidance, more responsive housing-provider interventions and policy-facing evidence.

KEYWORDS

lived experience; indoor environmental quality; co-production; social housing; resident engagement.

INTRODUCTION

Measured or prescribed IEQ does not necessarily reflect occupants' experience of their homes. Studies in social and renovated housing show substantial variation in thermal comfort, odour, health symptoms and perceived improvements in IEQ, highlighting the importance of considering residents' perceptions, actions and interactions with buildings alongside physical measurements (Vakalis et al., 2019; Willems et al., 2020). These interactions are particularly important in social housing, where affordability, building condition and residents' ability to control heating and ventilation can constrain apparently straightforward environmental actions (Braubach and Fairburn, 2010; Sharpe et al., 2015; Ginestet et al., 2020). Ventilation effectiveness depends on technical provision and how systems are understood, accessed and used (Few et al., 2024; Van Rooyen and Sharpe, 2024). Similarly, cooking can generate substantial indoor pollutant loads, while exposure is influenced by cooking practices and the operation of kitchen ventilation (O'Leary et al., 2019; Tang and Pfrang, 2023).

Drawing on two completed EPSRC Impact Acceleration Account projects in Wales, this paper asks how residents' lived experience can be combined with environmental monitoring to support healthier housing. The second project developed from the first

project's finding that awareness alone could not overcome constraints relating to affordability, comfort, safety, building condition and system usability.

METHODS

Both projects used participatory, mixed-method and socio-technical approaches, interpreting environmental measurements alongside residents' recorded activities. Cooking Up Good Air Quality for Better Wellbeing involved three Cardiff Council tenant households recruited using criteria including ethnic-minority household status, frequent kitchen use and availability across workshops. Temperature, relative humidity and CO₂ were monitored alongside 28-day kitchen diaries, with the first 14 days preceding the second workshop. Workshop and monitoring findings were examined with academic literature and Welsh policy, and residents reviewed both the content and visual form of the Good Practice Guide. The follow-on damp, mould and ventilation project combined stakeholder and resident workshops, behavioural mapping, room-level temperature and relative-humidity monitoring, household diaries, technical engagement and co-creation. Diary entries were aligned with corresponding monitoring periods, followed by cross-case thematic synthesis. Residents, housing partners, policy stakeholders and technical contributors reviewed the emerging Six-area Diagnostic Framework for clarity, relevance and practical usefulness. This staged process triangulated diary, monitoring and workshop evidence and incorporated participant and stakeholder review.

RESULTS AND DISCUSSION

Across both projects, lived experience helped explain measured IEQ patterns and translate them into practical action. In the first project, diary-recorded ventilation mentions increased by 8–32 percentage points across three case-study homes after the second workshop, while the distribution of CO₂ readings shifted towards lower concentration bands. These descriptive within-household changes do not establish causality but show how monitoring feedback can support reflection and reported changes in practice. Residents shaped and reviewed both the Good Practice Guide's recommendations and their presentation, including its visual accessibility and format.

In the second project, time-aligned diary and monitoring cases showed that combined window opening and extractor-fan use coincided with short-term relative-humidity reductions of approximately 20–30 percentage points, whereas cooking without effective ventilation coincided with increased or prolonged humidity. Because relative humidity is temperature-dependent, these findings were interpreted alongside temperature, timing and room-level patterns.

Resident accounts showed why these findings cannot simply become instructions to "open windows more": ventilation was shaped by comfort, affordability, security, accessibility, household routines, building condition and system usability. This aligns with evidence that damp and mould result from interacting moisture, ventilation, heating, building and socioeconomic factors (Benton, 2024; Bornehag et al., 2001; Fisk et al., 2010; Ginestet et al., 2020; Sharpe et al., 2015). The projects extend this literature by showing

how time-linked resident accounts can help interpret environmental measurements and shape practical support. The projects were small, context-specific and practice-facing; sensor placement, monitoring duration, weather conditions and self-reported diaries limit causal and statistical generalisation.

The combined evidence led to the Six-area Diagnostic Framework: financial constraint and fuel poverty; housing infrastructure and maintenance; everyday moisture-generating routines; ventilation knowledge, access and usability; social, household and health constraints; and tenant-centred support, communication and institutional trust. Together, these areas provide a pathway from visible symptoms through investigation of interacting causes to household-specific intervention and coordinated follow-up. The first project asks what actions may support healthier living; the second asks what needs to be understood before deciding which action is appropriate. The framework supports structured enquiry but does not replace technical inspection or professional judgement. Policy engagement was embedded through collaboration with Welsh Government and housing partners. The guide was developed in relation to WHQS 2023 and the Well-being of Future Generations framework, while the diagnostic framework supports a move from generic or blame-based explanations towards responses that consider building condition, affordability, household circumstances and institutional responsibility together.

CONCLUSIONS

The two projects demonstrate how lived experience can become practical evidence for healthier housing. Combining residents' accounts and everyday practices with environmental monitoring, professional knowledge and co-creation generated two complementary outputs: accessible guidance supporting healthier household practices, and a diagnostic framework supporting more responsive approaches to damp and mould. For the Buildings for People agenda, healthier buildings require performance to be understood through occupants' realities. Bringing residents' knowledge into diagnosis, intervention and evaluation can support housing practice and policy that is not only technically informed, but more usable, equitable and responsive to everyday life.

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Appendix 1.





Cooking Up Good Air Quality for Better Wellbeing



For more information:
Scan the code / visit:
<https://tinyurl.com/y/5w6b7uf>
email: watch@kjqcardiff.ac.uk

	Before Cooking	While Cooking	After Cooking	
Ventilation & Indoor Environment Quality	Open windows and external doors to ensure proper airflow. Also Try to: Turn on extractor fans if available. Consider daily ventilation for the kitchen, even if not 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: Keeping the fan on while opening the window can create a cross ventilation.	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.	Ventilation & Indoor Environment Quality
Cleanliness	In order to keep the cooking area clean and free from extra sources of contamination, Follow this: 1. Ensure the cooking area is clean and free from clutter. 2. Remove food waste prior to starting cooking. 3. Wash hands thoroughly before handling food.	Frequent cleaning helps reduce the indoor pollutants in kitchens. Clean as you go. Wash the dishes. Also Try to: Rinse some equipment while cooking.	After finishing cooking practices make sure to complete the following: 1. Wash all dishes and clean the kitchen thoroughly, including wiping down surfaces. 2. Clear any remaining condensation from windows.	Cleanliness
Time saving	FACT: Limiting cooking time can reduce stress & support a healthier lifestyle. Take out necessary cooking equipment (pans, chopping boards). Prepare all ingredients (chop vegetables, wash rice, prepare meat) before cooking.	Consider bulk cooking for time-saving and less exposure to cooking fumes such as preparing the sauce and refrigerating them in advance for future cooking. Use the right pan size that matches the gas burner to improve the burning process.	Pollution from cooking can be more harmful than outdoor pollution. FACT: 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 Decorate your kitchen with indoor plants.	Health, Safety & wellbeing

Appendix 1: 'Good Practice Guide', co-designed with Cardiff Council tenant volunteers through an EPSRC- IAA project.

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