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BREAKING THE MOULD

SHOULD LANDLORDS BE DOING MORE?

JUNE 2018

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FOREWORD

Our homes have the potential to either enhance or diminish our well-being, so it is important that we understand which factors have the most important implications, and how we can make changes that enhance health and wellness.

Disrepair through condensation and mould costs landlords millions of pounds each year and poses significant threats to the health of residents. The causal factors for mould and condensation are often misdiagnosed and misunderstood, prolonging the period of disrepair and frequently causing conflict between residents and their landlords. The Breaking the Mould study marks a significant step forward in shedding further light on what causes condensation and mould and how landlords can protect their residents, and their assets.

In the context of the housing crisis, and specifically with a shortage of homes of sufficient size and quality to safely house growing families, the fight against condensation and mould continues apace. Many factors contribute to high humidity in homes, primarily high occupancy, poor ventilation and poor insulation.

To resolve the underlying causes: reducing occupancy or replacing failed insulation is beyond the remit of the resident.

We spend as much as 90% of our time indoors. Effective ventilation systems in our homes are crucial, not only to the health of the occupants but also to protect the fabric of the building.

We welcome the findings of this study by Sustainable Homes challenging the widely accepted assumptions regarding condensation and mould and supporting the need for a more proactive approach from landlords.

Andy Makin

Managing Director
EnviroVent

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As the UK's market leader in sustainable ventilation solutions, EnviroVent understands the importance of indoor air quality to the health of occupants in a building. At EnviroVent we work with Registered Providers and landlords all over the UK to improve indoor air quality and create healthy homes, healthy families and healthy communities.

Condensation and mould are the visual indicators of poor indoor air quality but are only the tip of the iceberg, masking many harmful - sometimes invisible and odourless - airborne pollutants.

EnviroVent install ventilation systems in 20,000 homes throughout the UK every year, controlling condensation, eliminating mould and improving the health of residents.

With our direct employed team of nationwide ventilation installers we are uniquely placed to provide a one-stop solution from survey through to installation and lifetime servicing.

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EXECUTIVE SUMMARY

Damp and mould is a perennial British problem with major health and well-being implications for residents. Its presence in the home can raise exposure to allergens, cause or aggravate respiratory conditions and create an ideal environment for dust mites. This may have knock on effects on fuel poverty, rent arrears, void periods, legal liability and staff costs, which impact on landlords' ability to deliver against their duty of care and bottom line.

The causes of damp and mould in homes are complex and it is often a combination of factors that can lead to it developing. A deeper understanding of this complexity can improve the way that housing providers manage the problem. Standard responses such as advisory leaflets are often based on the assumption that resident behaviour is the key cause, but they can overlook limitations to residents' capacity to change moisture inputs and outputs.

Furthermore there is a risk that other potential causes of mould, including occupant density, building fabric, and energy and ventilation systems, are overlooked. Actions beyond the standard responses are therefore often required to tackle the problem.

Breaking the Mould investigated the causes of damp and mould from a sample of stock managed by social landlords. It sheds light on how various contributing factors interact to raise or lower the probability – and severity – of mould occurring.

The research challenges the sector assumption that resident behaviour change is the key solution for tackling damp and mould in homes and looks into more detail at factors including landlord response, ventilation and occupancy density.

LANDLORDS SHOULD BE DOING MORE

The recommendations for landlords lay on a more proactive and preventive approach. Key recommendations for improving mould control and resident health include:

- Understand limitations to resident behaviour
- Resolve issues earlier through practical action
- Provide staff training
- Review the process for dealing with mould complaints
- Work with residents to tackle myths around heating and ventilation
- Rethink the ventilation strategy

THE STUDY FOUND

Strong correlation between occupant density and mould

The more people live in a home, the more breathing, showering, clothes washing and drying, and cooking takes place there. To control this more ventilation is required to remove this extra moisture.

Under-heated homes more likely to suffer

Fluctuations in temperature affect the capacity of air to hold moisture. As air cools the risk of condensation increases.

Homes with higher quality of insulation were less likely to experience mould

As well as uncontrolled ventilation from leaky buildings, homes may be ventilated by opening windows, extract fans, whole-house ventilation systems or trickle vents, if installed, ventilation systems must meet residents' needs if they are to be used effectively.

Effective ventilation is vital

Poor quality of insulation, in older housing stock particularly, results in cold spots on walls that may attract condensation.

Link between incidence of mould and residents' respiratory conditions

There was a noticeable increase in residents with respiratory conditions in homes where more mould was present.

A NEW APPROACH

The research highlighted several far-reaching implications regarding landlord stock management.

- A new way of managing stock around demography is required
- A culture of damp and mould awareness should be embedded in the organisation
- When providing homes, space and quality must be prioritised over quantity
- Fuel poverty and mould can be tackled together
- Housing providers must increasingly be service providers

KEY TERMS

RELATIVE HUMIDITY (RH)

Relative humidity is a measure of the water content of the air, expressed as a percentage of the maximum amount of water that the air can hold at a given temperature. Warmer air has greater capacity to hold water than colder air.

DEWPOINT TEMPERATURE

This is the temperature at which the air becomes saturated, or reaches its full water-holding capacity (100% RH). At this point, water will condense out of the air and onto any cool surface, such as an external wall. Condensation can begin to occur when RH reaches around 65-70% RH.

VENTILATION

Housing ventilation controls the rate at which air in a home is replaced. It enables moist air and other pollutants to be removed from the home. Most homes, particularly older properties, are ventilated naturally, through windows, air bricks, trickle vents, chimneys, and also through small cracks in walls and under doors. There may be controlled ventilation, using extract fans (particularly in kitchen and bathroom), or whole-house solutions such as Positive Inlet Ventilation (PIV) or MVHR (Mechanical Heat Recovery Ventilation).

GROWTH CONDITIONS FOR MOULD

There are hundreds of species of mould that grow in homes, including aspergillus, cladosporium, penicillium and stachybotrys spp. The various species vary in toxicity, but most of them require conditions similar to these:

- Mould spores - prevalent in the air
- Moisture - particularly water vapour condensing on a surface
- Temperature - while moulds prefer warmer temperatures, relative humidity is more important.
- RH rises when temperatures fall, so in our study, greater growth was found at lower room temperatures
- Slightly acidic environment
- Nutrients - in particular cellulose, commonly found in wallpaper and fabrics
- Time - mould growth appears 6 hours to 10 days after provision of suitable conditions

The focus of this study is the control of high humidity and condensation in houses as one of the most significant growth conditions.

STANDARD RESPONSE OF HOUSING PROVIDERS TO MOULD REPORTS FROM RESIDENTS

Figure 1

WHY UNDERTAKE THIS STUDY?

Damp, mould and condensation continue to be key issues affecting landlords and their stock. Depending on how it is counted, various research suggests anywhere between 5% and 50% of homes suffer from black mould **(1)** and many more have condensation issues.

Mould presence in homes affects housing providers' ability to deliver against their duty of care and bottom line. Secondary impacts of extreme mould problems and their health implications include rent arrears, void periods, legal liability and staff costs. This is therefore a pervasive issue with serious effects on both residents and landlords.

Housing providers surveyed by Sustainable Homes raised damp and mould as a key concern and requested support and advice on tackling the problem and managing residents' experiences. The fact that this issue is ongoing reveals that standard procedures for dealing with incidents are proving inadequate. Delays in diagnosing the best solution leave the resident exposed to the problem for longer than necessary, which has two major impacts:

1

ON RESIDENT HEALTH

Damp and mould can have severe respiratory impacts by raising exposure to allergens, and causing or aggravating respiratory conditions. The high humidity that leads to mould is also a condition that is ideal for dust mites.

2

ON THE CONDITION OF THE PROPERTY

Damage to property can include wet rot and blistered plasterwork. This must be repaired, leading to increased costs for the landlord.

At present, housing providers too often take a passive approach where resident behaviour is attributed as the main cause, and the onus is put on residents to solve damp and mould issues through behaviour change **(see fig.1)**. This approach needs to be fundamentally transformed, so that the housing provider takes a far more proactive approach to mould diagnosis and solutions.


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(1) London Borough of Lewisham (2011) Short review into the health impact of damp and mould in housing, Housing Select Committee;; Menon & Porteous (2011) Design Guide: Healthy Low Energy Home Laundering MEARU,

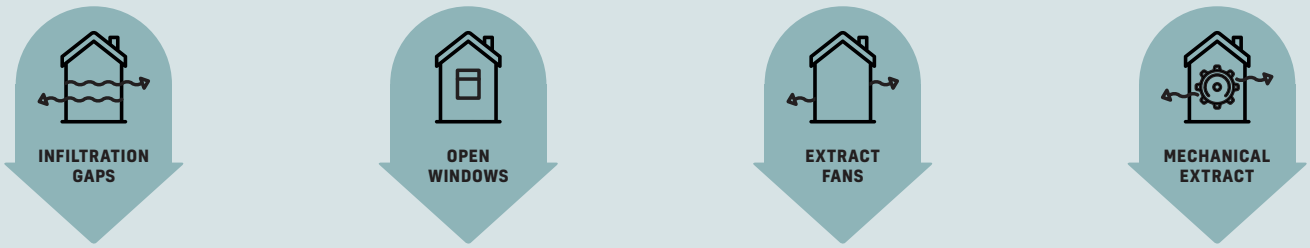
MOULD RESPONSE CONUNDRUM

POTENTIAL MOISTURE INPUTS

Typical moisture inputs from a family of four in a flat with 75m² floor area and an air volume of 168m³.

Total moisture input 11.1kg/day - 8.8 complete air changes required per day to remove all moisture inputs.

POTENTIAL VENTILATION METHODS



Ventilation options to remove moisture can include natural ventilation such as opening windows and infiltration through gaps, as well as powered systems such as extract fans - commonly found in kitchens and bathrooms - and mechanical ventilation. It is unlikely that all of these options will be available in any one home, and there are numerous reasons why the available options may not be used to full capacity. For example, fans and vents may cause draughts or noise disturbance. If the required number of air changes cannot be achieved, not all the moisture can be cleared, so condensation will likely occur as a result.

When a resident reports a mould problem to their housing provider, a standard first response is to send a leaflet with behaviour change advice. While this can be a valuable way of raising resident awareness and understanding, it does not always provide a complete solution because it does not take into account restrictions on residents' capacity to change their actions, or wider factors responsible for mould growth that are entirely beyond residents' control.

THERE ARE A NUMBER OF LIMITATIONS TO RESIDENT BEHAVIOUR CHANGE AS A SOLUTION, INCLUDING:	
BEHAVIOUR CHANGE MEASURE	**LIMITATION**
DRY CLOTHES INDOORS	*OUTDOOR SPACE MAY BE LIMITED*
OPEN WINDOWS AND TRICKLE VENTS	*SAFETY, SECURITY AND DRAUGHTS*
KEEP LIDS ON PANS WHILST COOKING	*IMPRACTICAL AND LOW IMPACT*
ENSURE EXTRACTOR FANS ARE USED IN BATHROOMS AND KITCHENS	*LOUD FANS MAY CAUSE DISTURBANCE*

Key causes of mould, particularly occupancy density and building fabric, are beyond the control of residents. A change of approach is therefore required to tackle the root causes of the problem.

WHAT DID WE DO?

Data was collected from a sample of 260 homes across the UK from two housing associations and two local authorities.

The study took place over 14 months from February 2017. Anonymous data was collected for a range of factors that can contribute to mould development, including SAP, occupant density, ventilation and temperature fluctuations. This study aimed to identify the relative importance of each factor and to direct the housing provider as well as residents to the most appropriate solutions. **A three-stage process was designed, to identify factors that prevent mould, as well as those that cause it.**

PHASE 1 | RESIDENT ENGAGEMENT

A questionnaire was circulated to residents from participating landlords aiming at understanding the demographics and behaviour patterns as well as mould indicators. The questionnaire was designed to elicit responses from residents with and without mould in their homes. The responses were analysed alongside asset management data and EPC data, in order to match characteristics of the home with the incidence (or non-incidence) of mould. A 'Mould severity score' (MSS) was devised, based on the size of a home and the extent of the mould, **(see fig.2)**.

MSS SCORE	
0	NO MOULD
0 - 1.5	SLIGHT
1.51 - 3	MODERATE
3.1 - 4.5	SERIOUS
4.51 - 6	SERIOUS
6+	VERY SEVERE

Figure 2

PHASE 2 | DATA MONITORING

Over the winter of 2017/18 logging equipment was placed into 52 homes to measure temperature and humidity. The sample was selected so that a third of the properties had no mould, a third had a 'slight to moderate' issue and a third had a 'serious' or greater problem. Weather data was also gathered from local weather stations in order to understand to what extent internal temperature and other conditions were affected by outdoor temperature.

This phase looked at the relationship between how a home heats and cools, and incidences of mould formation. It investigated the effects of airtightness, insulation, temperature fluctuations, controlled and uncontrolled ventilation.

CO_2 monitors were used in a cross-section of those homes, to help to determine whether air changes were taking place.

PHASE 3 | ANALYSIS

The various datasets and patterns identified in the previous phases were compiled and analysed in parallel with additional information available about each of the homes in the sample, including:

- The size of the home (measured as total floor area or TFA)
- Energy usage of the home during the study (from meter readings)
- SAP value (the measure of home energy efficiency)
- Levels of wall insulation and glazing types (from Energy Performance Certificates)
- Ventilation assessments
- Observations of mould and behaviour by the research team during home visits

WHAT DID WE FIND?

Research found that nearly 1/2 of the homes studied showed mould levels varying from slight to very severe. The key factors leading to mould presence and severity are below.

OCCUPANT DENSITY

The strongest correlation to the appearance and severity of mould was occupant density **(fig. 3)**. If a home has a higher number of occupants than its neighbour, this will invariably lead to a higher level of moisture inputs through regular daily behaviours such as breathing and showering. At the same time the likely ventilation rates are likely to remain in proportion to the size of the home. Every pass of our analysis reaffirmed this very strong link.

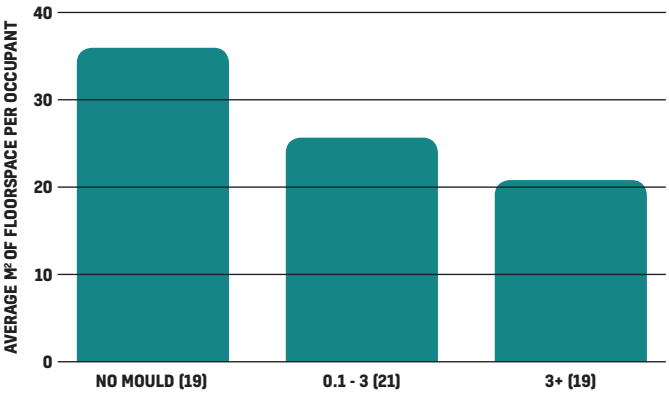


Figure 3. Occupant Density

ENERGY EFFICIENCY OF HOMES

Under-heating of homes

The severity of mould in the monitored homes was also linked strongly with the average indoor temperatures found there (fig.4). Homes with a cooler average temperature were more likely to have mould.

While it is known that high temperatures can promote growth, cooler air temperatures see RH rising.

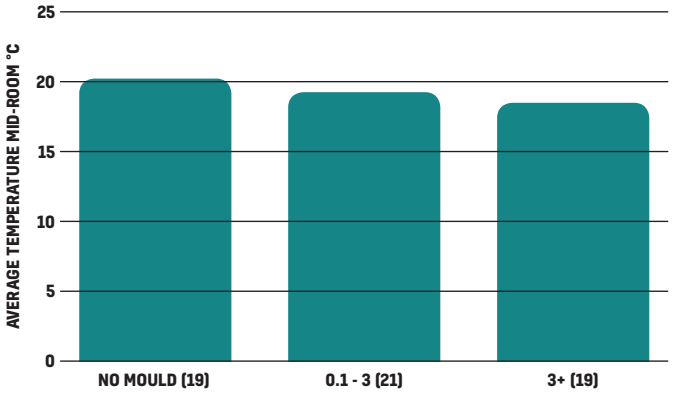


Figure 4. Ambient Room Temperature

The homes with highest mould severity not only had lower average temperatures, they also displayed slightly higher energy usage. This demonstrated that they were the least energy efficient homes to heat. By contrast the most energy efficient homes were more likely to be unaffected by mould. This has important implications for tackling fuel poverty , which is another key risk of inefficient and therefore under-heated homes.

Temperature fluctuations

An additional impact of hard-to-heat homes was that wider temperature fluctuations were likely to increase mould occurrence.

Particularly during colder months, temperature fluctuations occur both over time (between day and night, as well as over longer time periods) and over space (between the centre of the room and the wall).

Where these fluctuations were more pronounced, mould was more likely to be present. This is shown in **(fig. 5)**, which demonstrates the strong correlation between mould incidences and daily fluctuation in temperature.

BUILDING AIRTIGHTNESS

Airtightness refers to the resistance of the building envelope to inward and outward leakage of air. New buildings are required to meet airtightness standards, which help to reduce uncontrolled ventilation and heat losses. However as airtightness improves, there is the risk of moist air and other pollutants building up, so it is vital that adequate ventilation is provided to compensate for the reduced rate of air exchange.

The different daily behaviour of residents had a great impact in the temperature variations of the home. In colder homes it is common for families to gather in one room, and leave radiators off in unoccupied rooms. These warmer rooms carry more moisture in the air, and as doors are opened this air travels to colder rooms, and as the moist air cools, it can condense on the walls there.

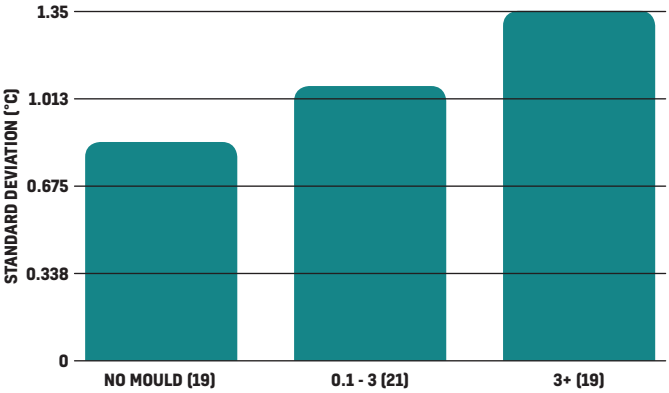


Figure 5. Daily Temperature Fluctuation @ Wall

A reduction in the temperature of the home causes an increase in relative humidity, creating a perfect scenario for mould growth. Much of the heat is lost through the walls and windows, especially in homes with lower SAP and poor insulation, so the air next to these surfaces has particularly elevated levels of humidity. The homes which cooled the fastest therefore displayed the greatest likelihood of mould.

The study also identified that differences in temperature over space, between the mid-point of the room and the surface of the wall, contributed to increased mould levels **(see fig.7)**. If a building loses more heat, it creates a temperature gradient between the average room temperature and the outside wall temperature. The greater this temperature gradient, the greater the severity of the mould issue.

MYTH BUSTER | VENTILATION LETS OUT ALL THE HEAT

Most of the heat in a home is stored in the solid objects, including the walls, floors and furniture, rather than the air, which takes surprisingly little energy to heat. If warm, moist indoor air is replaced with cold outdoor air, the furnishings in the room will transfer their energy and re-heat the air relatively rapidly.

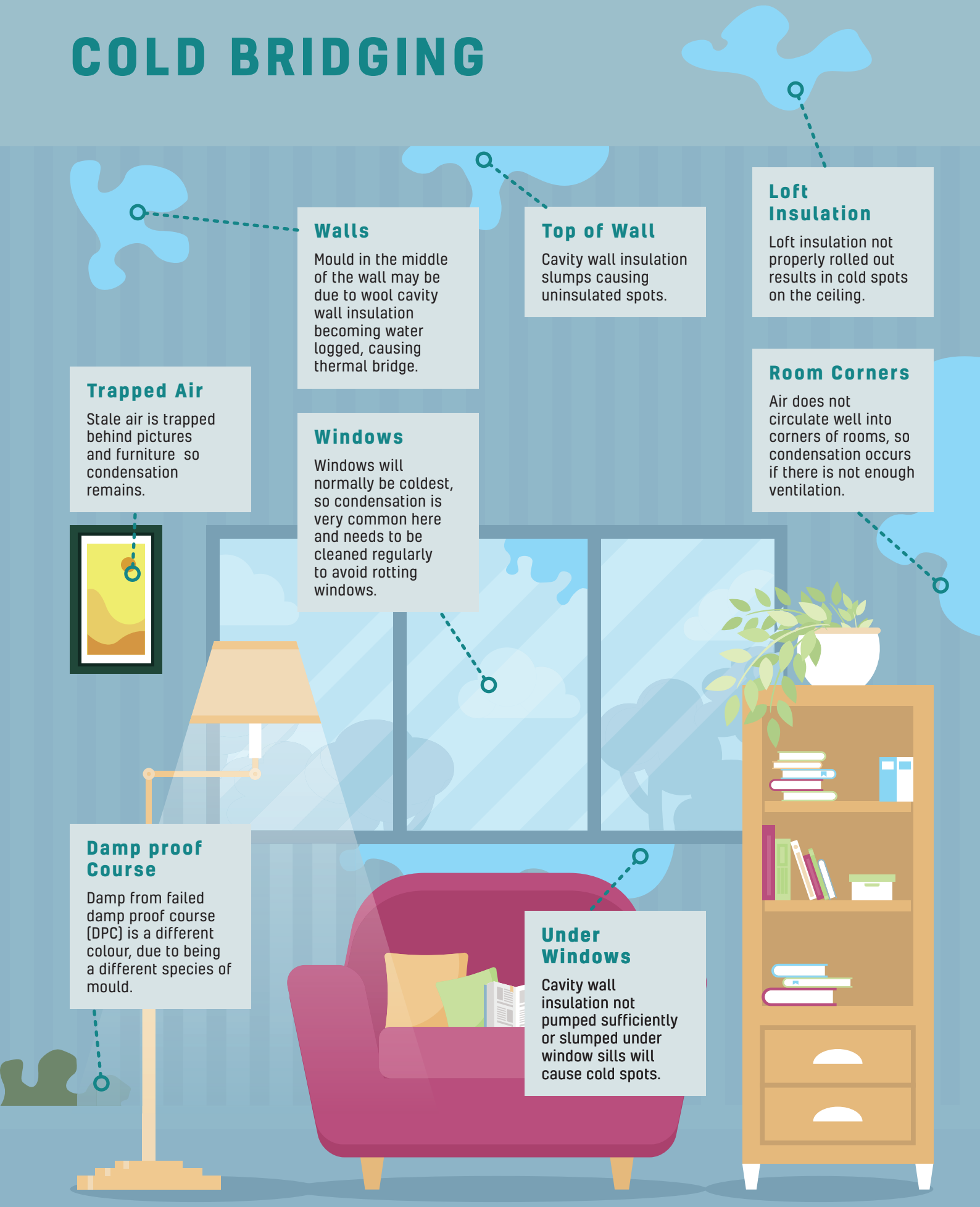
Of the typical 50kWh required to heat a UK home for a day in winter, only 1/6 is used to heat the air and ventilate. The remaining energy is radiated through external surfaces. An uninsulated loft could even double the heating requirements, to 80-90kWh/day. Therefore to save energy and reduce heat loss it is far better to seal the home with insulation, then let the stale air out when necessary, than to keep windows closed.

MYTH BUSTER | COMBAT DRAUGHTY HOMES BY TURNING UP THE HEATING

Moving air feels colder than still air, because it is better at removing evaporating moisture on the surface of the skin, and this energy transfer causes the skin to cool. A small increase in air temperature therefore makes little difference to the perception of cold, if the air is moving.

Instead, draught-proofing and greater airtightness are far more effective ways of increasing thermal comfort, by reducing infiltration and air movement.

COLD BRIDGING



Walls

Mould in the middle of the wall may be due to wool cavity wall insulation becoming water logged, causing thermal bridge.

Top of Wall

Cavity wall insulation slumps causing uninsulated spots.

Loft Insulation

Loft insulation not properly rolled out results in cold spots on the ceiling.

Trapped Air

Stale air is trapped behind pictures and furniture so condensation remains.

Windows

Windows will normally be coldest, so condensation is very common here and needs to be cleaned regularly to avoid rotting windows.

Room Corners

Air does not circulate well into corners of rooms, so condensation occurs if there is not enough ventilation.

Damp proof Course

Damp from failed damp proof course (DPC) is a different colour, due to being a different species of mould.

Under Windows

Cavity wall insulation not pumped sufficiently or slumped under window sills will cause cold spots.

Figure 6. Temperature variations within a room causing cold bridging. © Sustainable Homes

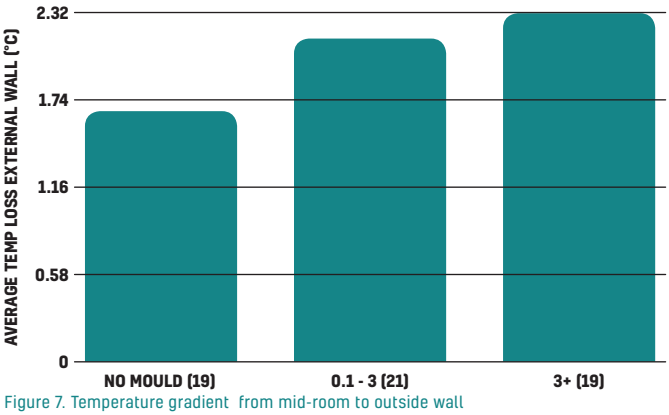


Figure 7. Temperature gradient from mid-room to outside wall

Surfaces around a room conduct heat at different rates, so cold spots in the walls or ceiling may give rise to condensation. In **figure 9** below, both rooms have a similar ambient air temperature.

The image on the left shows a cold spot on a ceiling where loft insulation was poorly laid. The difference in temperature between warmest and coldest surfaces is considerable, varying between 8-10 degrees. Therefore the dew point temperature can be reached even at moderate relative humidity, so condensation is likely to occur.

In the image on the right, there is a similar cold spot, but the difference between the surface temperatures is much less, at 4-5 degrees, and so humidity will need to be much higher before condensation will occur.

As a result, homes with both temperature fluctuations and thermal bridging are particularly vulnerable.

INSULATION

The study found that homes with a higher quality of insulation were less likely to experience mould. Meanwhile homes with poor quality insulation, in older housing stock particularly, could lead to cold walls on which condensation was more likely to occur **(see fig.8)**. Solid walls, unfilled cavities, failed cavity wall insulation (CWI), poor installation, lack of maintenance, and numerous other building defects or exposed locations were all critical contributing factors to mould growth. These are factors that are often missed by housing providers.

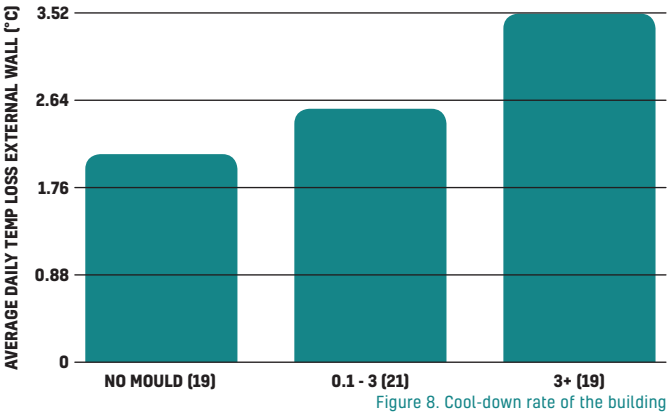
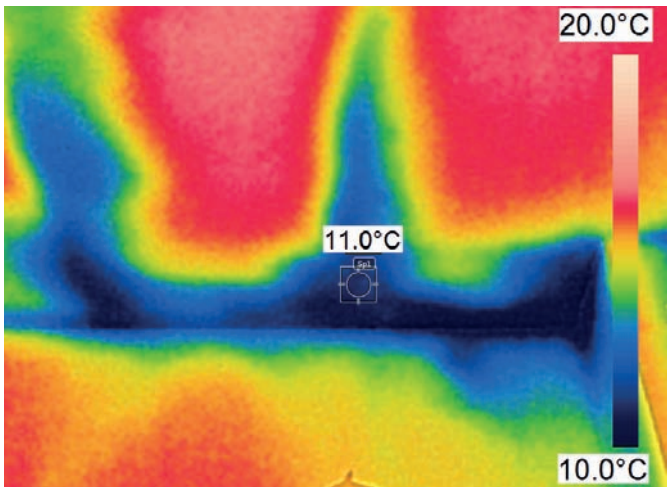


Figure 8. Cool-down rate of the building



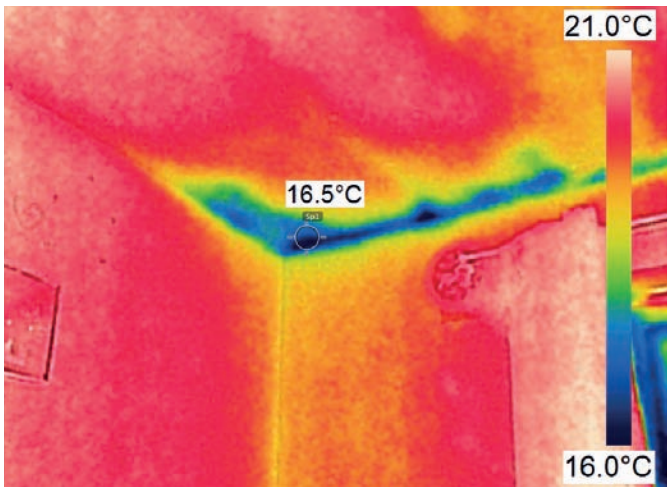


Figure 9. Thermographic images of cold spots at junction of wall and ceiling - condensation risk. The scale is slightly different in each image - the same colours correspond to different temperatures. © Sustainable Homes

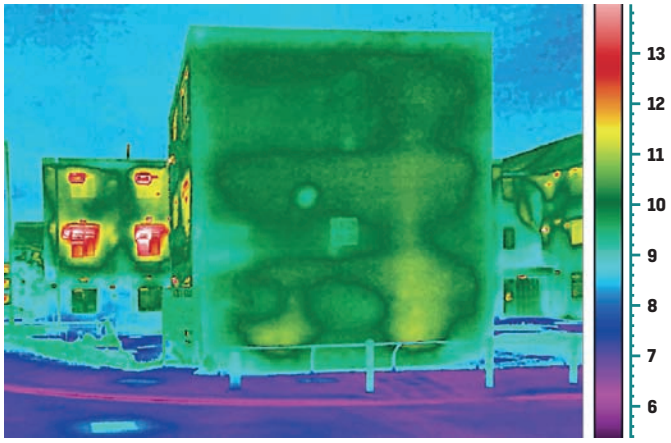


Figure 10. Thermal image of failed cavity wall insulation. © ARP Energy Services

In **figure 10** above, taken during a project to extract failed cavity wall insulation project, regions heated by radiators cause uneven heat losses from a wall made damp due to CWI becoming waterlogged and material degrading due to age. These radiators have also partially dried the wall in these areas. A program of CWI removal and replacement can resolve the problem.

CAVITY WALL INSULATION

Insulation in walls, floors and lofts helps to limit heat losses from a home and reduce energy bills.

Cavity wall insulation (CWI) is one of the most common methods for walls, using insulation material pumped into the space between brickwork. Solid wall insulation is gaining in popularity, but is expensive, and so most older, solid wall homes remain uninsulated. Failed cavity wall insulation is a problem facing many homes.

Commonly arising issues include:

- Gaps under windows or at the top of walls, where insulation has settled
- Water logging of certain insulation types
- Uneven dispersal of insulation within walls

This can lead to inconsistent temperatures across the wall. Condensation is most likely to occur at cold points of the wall, termed thermal bridges. Loft insulation can sometimes halve heat losses from a home, though if it is poorly installed, there can be gaps where cold spots can form on ceilings.

VENTILATION

Carbon dioxide (CO_2) monitors were used in 24 homes to assess how well rooms were being ventilated.

A background level of CO_2 is approximately 400 parts per million, but the respiration of residents in enclosed spaces causes it to rise. A bedroom with closed doors and windows may see CO_2 levels rise up to 5000ppm overnight, and RH levels will rise in tandem. The CO_2 monitors were intended to find whether high CO_2 levels were sustained, indicating that ventilation was inadequate.

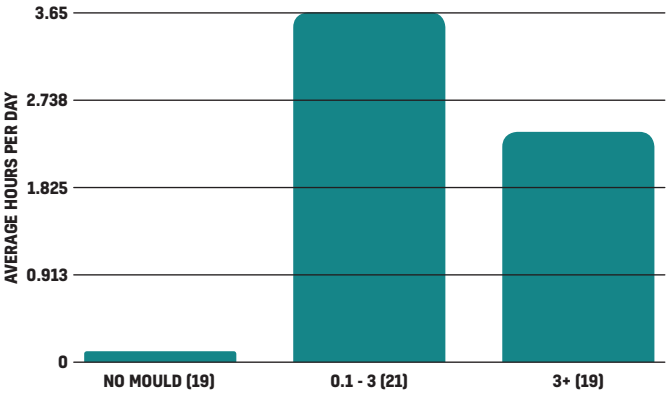


Figure 11. Measurements of CO_2 as a means of estimating ventilation rates

In the homes with no mould, build-ups of CO_2 dissipated very quickly **(see fig.11)**. Meanwhile 60% of homes with mould displayed CO_2 build-up, suggesting that slow ventilation rates can increase the likelihood of mould. However the remaining 40% of homes with mould that displayed no build-up of CO_2 suggested that other factors can cause mould beyond rapid ventilation.

Of homes with no mould, nearly 90% had a bathroom extract fan **(see fig.12)**. This compared to 70% of the rest of the homes monitored, and suggests that bathroom fans may be useful for preventing mould. Kitchen extract fans slightly reduced the risk of mould.

The surveyor was asked to observe at the time of the visit whether windows or trickle vents were open. These observations were made during winter months, so only 10 of 59 homes had a window open, but the majority of these were mould-free.

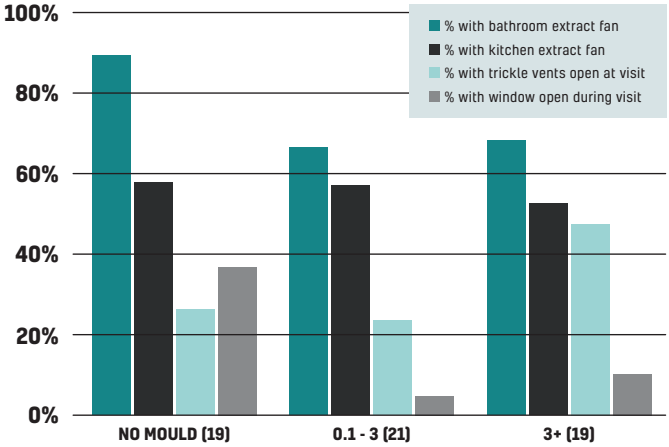


Figure 12. Ventilation observations made at home visits

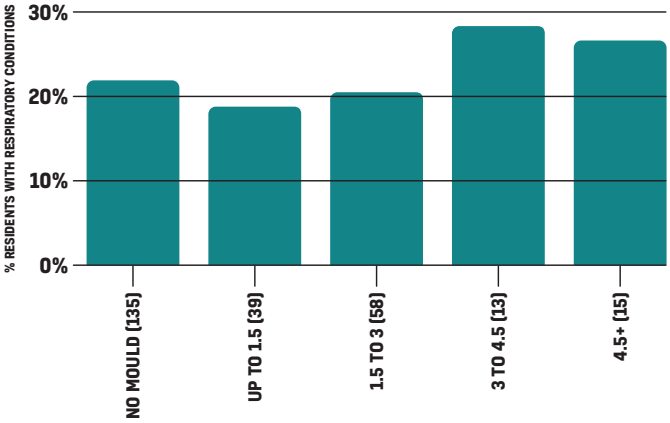


Figure 13. Link with mould severity and respiratory condition

19 of the 59 homes had trickle vents open, with the remainder either closed or not installed in the monitored room. Interestingly, homes in the 'serious' (3+) category were more likely than other categories to have trickle vents open. This may have been because they were opened in response to mould already present, rather than as a means of preventing it.

RESIDENTS HEALTH

This study found a relationship between the amount of mould in a home, and the incidence of long-term respiratory conditions. This reflected the findings of previous studies that have found links between mould and numerous other health conditions including asthma **(2)**, headaches **(3)** and even depression **(4)**. High indoor humidity creates favourable conditions for mould, as well as a suitable environment for dust mites and bed bugs, which are also allergenic.

Figure 13 shows the relationship between respiratory conditions and mould presence. In homes with no mould, around 22% of residents reported they had a long term respiratory condition (including asthma and COPD). In homes with higher incidence of mould, this rose to over 27%.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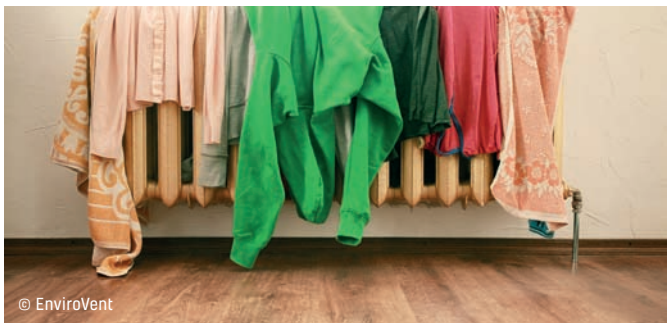
MYTH BUSTER | CLOTHES SHOULD NOT BE DRIED ON A RADIATOR

Radiator drying should be avoided if possible, as it blocks the heat from entering the room. However sometimes it is a necessity, particularly if there is no outdoor drying space and no tumble driers, which are highly energy intensive and therefore expensive.

Moisture from a load of washing needs to evaporate regardless of whether the clothes are on a radiator or not. If clothes take more than approximately 8 hours to dry, there is a high risk of mould forming in the clothes, so a radiator is a practical option for thicker items including coats and gloves.

If clothes must be dried on the radiator, residents should be made aware that rooms will be harder to heat so energy usage may increase. Additionally, adequate ventilation must be provided to respond to the rapid increase in humidity.


© EnviroVent

(2) Gent et al. (2002) Levels of Household Mold Associated with Respiratory Symptoms in the First Year of Life in a Cohort at Risk for Asthma, Children's Health Articles

(3) Platt et al. (1989) Damp housing, mould growth, and symptomatic health state, BMJ

(4) Shenassa et al, (2007) Dampness and Mold in the Home and Depression: An Examination of Mold-Related Illness and Perceived Control of One's Home as Possible Depression Pathways, AJPH

LANDLORDS NEED TO DO MORE

There is more to be done to tackle damp and mould beyond changing resident behaviour. These are the key actions landlords should be taking:

Understand that residents cannot always make major changes to their moisture inputs or ventilation habits.

The most significant finding from this study was that mould is most closely linked to the amount of living space per person. Particularly in the case of large families, condensation can be difficult to avoid. Residents should counteract the greater moisture outputs of high occupancy densities by increasing ventilation where possible, but housing providers must recognise that there is often a limit to the measures residents can take.

Resolve issues earlier through visits and practical action.

When reports of mould are received from residents, particularly in high-occupancy homes, a full investigation should include a home visit where possible, to understand the ways in which the residents are living in the home and identify any defects in the property. The tenancy agreement generally places all the onus for condensation on the resident. This research suggest this approach isn't always fair.

Maintenance professionals should be alert to cold bridging issues that may be caused by missing or failed insulation. Thermographic surveys or boroscope surveys are among the ways to identify this.

Instead of defaulting to a leaflet for residents, use investigations to inform an individual response to the complaint. Often a combination of installations, either of ventilation or insulation, alongside behaviour change recommendations will deliver the best results. This should help to prevent recurring issues and misuse of ventilation options, and improve residents' comfort and well-being.

It is also often cheaper to install more user-friendly extract fans and to spend time explaining their use to the residents, rather than to suggest behaviour changes. These will simply delay the response and require the resident to live with the problem for longer, before eventually installing a new fan when the mould persists.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Provide training for staff.

The continued prevalence of damp and mould issues in social homes indicates a knowledge gap within housing organisations. Front line staff, including call centre staff, housing officers and asset managers, should be trained in gaining a deeper understanding of the residents' situation and the limitation to the behaviour change actions they can take.

In particular, front line staff should be trained to identify common signs of inadequate insulation or other failures of the building fabric.

In older homes where temperature fluctuations are greater, there is less that residents can do to avoid dew point being reached. The age of the home should therefore be taken into account when dealing with complaints. In older homes particularly, technical improvements to the ventilation system or building fabric should be considered from the outset, alongside any viable behaviour change recommendations.

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Review the process for dealing with mould complaints.

Customer service processes for dealing with resident complaints of mould should be assessed to ensure that they generate a full picture of the situation and potential causes. As part of this, scripts and follow-up should gather information on the following areas:

- Extent of the problem – how many rooms, and how many surfaces within those rooms are affected.
- Occupant density - how many live there, and size of the home. If asset management data can be accessed here, this may also determine levels of insulation and ventilation.
- Ventilation – types (if any) installed, and how effectively they are working - This can be a good opportunity to convey the message of the importance of ventilation
- Age of property - Older homes are more likely to have ventilation or insulation issues. - Insulation in newer homes built since 2006 should be sufficient to prevent condensation and mould. However, ventilation installed to new buildings is often at the minimum level needed.
- Insulation – access asset management information for details of insulation type and installation time. Wherever possible, conduct an inspection to determine present condition.
- Clothes drying arrangements - practicalities of using outdoor drying space, or tumble dryer.


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Work with the resident to tackle some of the myths surrounding heating and ventilation and offer practical solutions.

It is crucial to work closely with residents to ensure that ventilation systems are suitable for the residents' needs and are being used as intended. This requires good communication and sensitivity to individuals' needs and experiences, since it is relatively common to find that vents are blocked or fans deactivated. Helping residents to understand their heating controls can also ensure that they are used efficiently.

Older fans may be noisy at night, and may let cold draughts in when not in use; new one-way, slow-start and quiet models can resolve these problems. A humidistat can sometimes be a useful way to control a fan, though falling temperatures are likely to make the fan start at night so fan noise levels are an important consideration.

Well-designed ventilation that takes the occupants into account can help ensure the long-term success of mould prevention measures and improve the living environment for residents.

New builds and refurbishments should make better use of ventilation.

New homes are too often built with lower airtightness to avoid the need for a ventilation system. Instead, homes should be built to higher airtightness standards and an adequate ventilation system should be provided to compensate. Previous research conducted by Sustainable Homes found that more efficient homes increased the revenue for landlords by helping to reduce energy costs and increase rent affordability for residents **(5)**. The additional costs of building to higher specifications should therefore be compensated for by savings from more secure tenancy, fewer maintenance calls and better resident-landlord relationships.

In cases where the airtightness cannot be reduced, the threshold for installing a ventilation system should be set at a higher air change rate . This will help to future-proof the home against higher occupancy densities in due course, which would raise relative humidity levels.

WHAT ARE THE IMPLICATIONS FOR LANDLORDS?

Landlords need to learn a new way of managing residents around demography.

At a time when living space in homes is increasingly being squeezed, the findings from this study show that there is an important reason for reviewing minimum space standards and setting requirements based on the number of occupants.

Floor area and ceiling heights should be reviewed during new build and retrofit projects, particularly where there is potential for high occupancy. A good understanding of the relationship between occupant density, expected moisture outputs and mould risk is vital from the planning stages of projects onwards.

In order to understand the occupant density of existing homes it can be valuable to carry out regular censuses. Occupancy levels should be recorded as residents move in.

Embed a culture of damp and mould awareness in the organisation.

Landlords have focused on traditional skills in asset management and have been slow to catch up with the technology we now have in homes. As a result a knowledge-action gap has developed.

A more proactive approach is required, with damp/mould being treated as seriously as pressing matters, such as a water or gas leak. This will require upskilling and informing staff, providing practical training to asset managers and reviewing procedures for dealing with mould reports.

This will help to minimise damage and harm, prevent recurring mould issues and ensure that the causes of the problem are treated rather than the symptoms.

(5) Sustainable Homes (2016) Touching the Voids: The impact of energy efficiency on social landlord income and business plans

Sacrifice quantity for space (and quality), or take a new approach to high density schemes and ventilation.

A key part of housing associations' social purpose is the provision of comfortable, suitable homes for residents. This means providing adequate living space, suitable drying space and sufficiently high ceilings, particularly for high density schemes. If higher quality, more spacious homes result in fewer properties overall, this is a consideration that must be taken.

Sufficient insulation can overcome temperature fluctuations and gradients that lead to resident discomfort, housing inefficiency and mould prevalence. Meanwhile high ventilation standards should be carefully planned to avoid discomfort to the resident. It is worth noting that fabric heat losses are typically many times greater than the heat losses from adequate ventilation, so effective insulation should compensate for additional ventilation.

A switch of thinking is needed, from housing provider to service provider.

An increasing shift is occurring in the social housing sector, where traditional social landlords are transforming into multi-tenure landlords, delivering a mix of social and private rent, shared ownership and sale. This is already creating a change in the relationship between landlords and residents; instead of subjecting tenants to standard advice and solutions, landlords are increasingly becoming service providers that recognise residents' desire for independence and choice. This approach must be further developed in the context of damp and mould treatment. Housing providers should listen and communicate more closely to residents and respond more to individual needs when dealing with mould reports. This will help to foster stronger resident landlord relationships and ensure a more collaborative, successful and sustainable solution to damp and mould.

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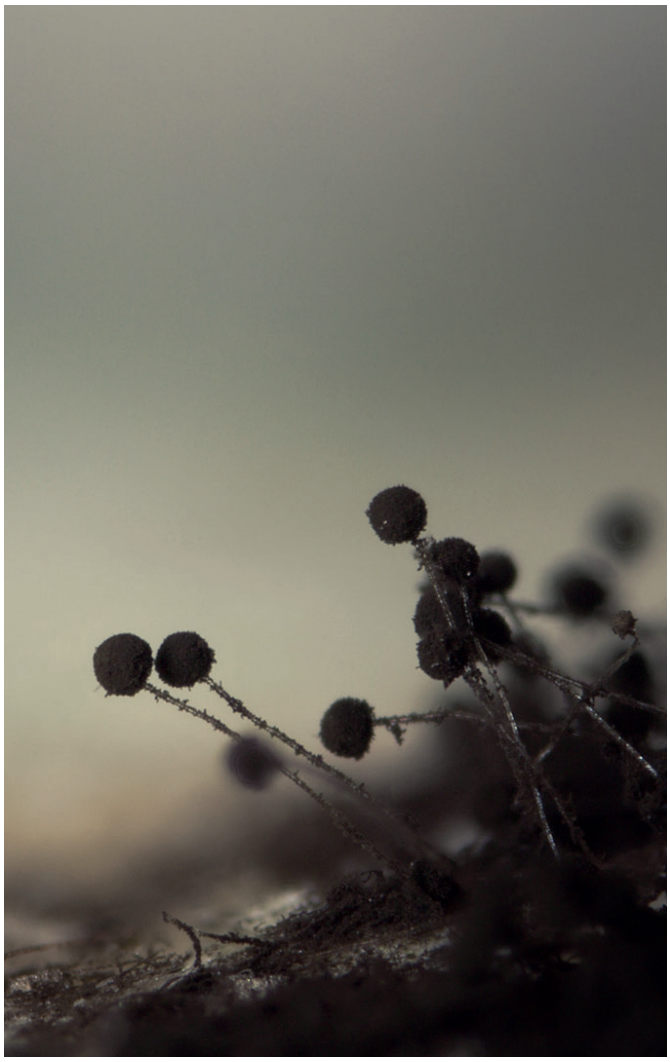

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