



UKCMB UK Centre for Moisture in Buildings

Appendices

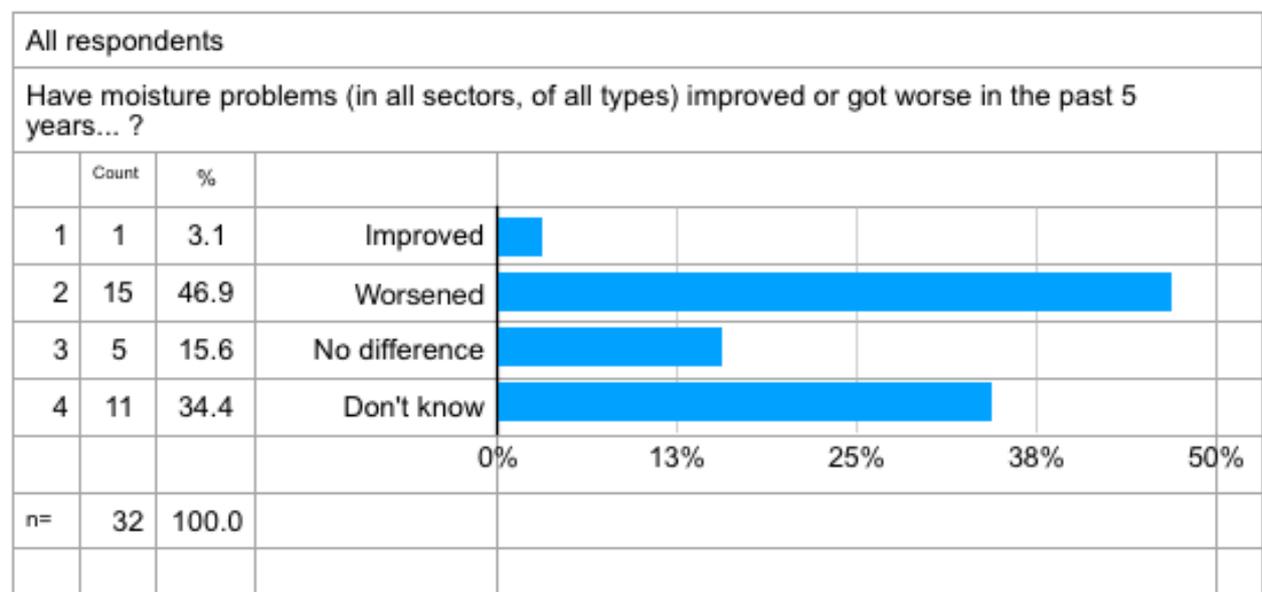
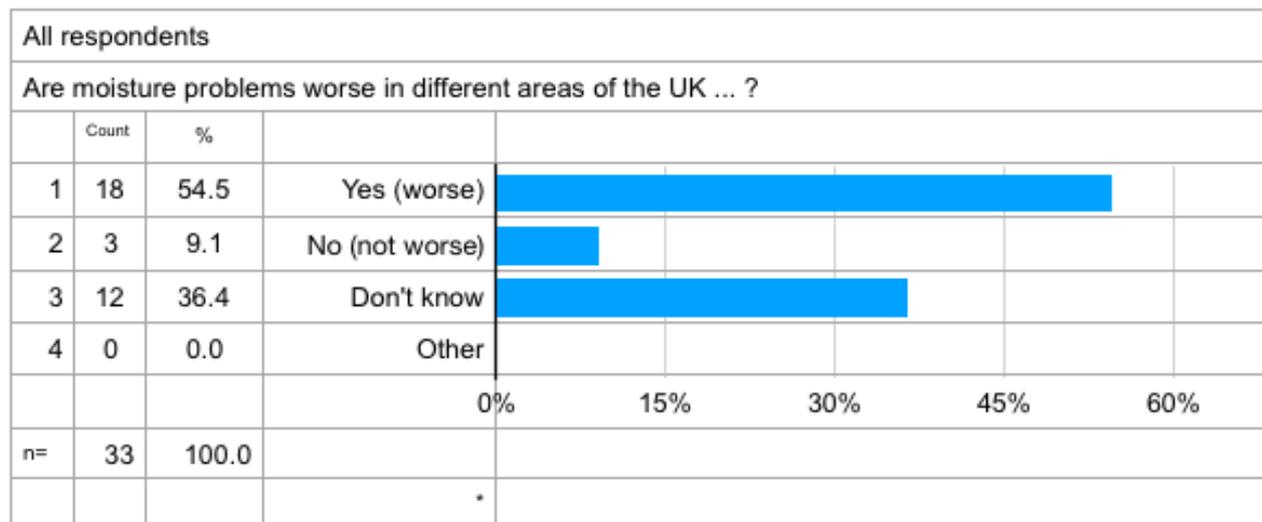
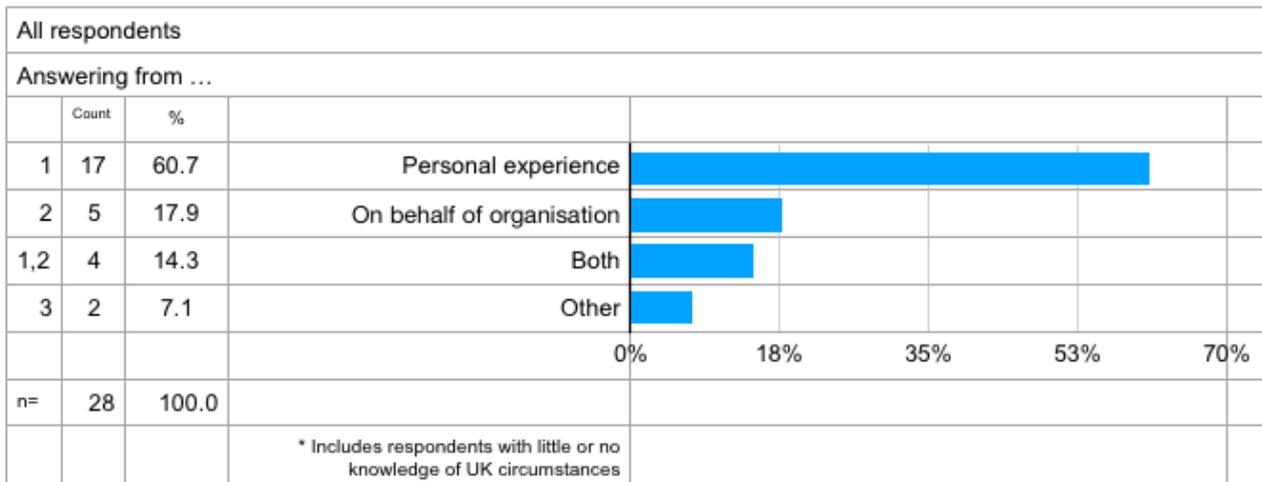
UK Moisture in Buildings Survey

Conditions, Actions and Outcomes

Adrian Leaman & Neil May



Appendix A – Frequency histograms



Appendix B – Comments

Introduction

Survey comments are presented as follows:

- By question (B1 to B21, see below Index) in questionnaire order.
- Alphabetically within question headings.
- Names, organisation names and place names removed to protect identities of respondents.
- Line numbers added for referencing in main report. These are not case numbers.
- Acronyms spelled out where necessary.

Spell and grammar lightly checked.

Index

Survey comments are presented as follows:

Your interest in this subject ...

- B1 In your experience what proportion of UK homes do you think experience serious problems of moisture ... ?
- B2 In your experience what proportion of homes do you think experience **any** problems of moisture (i.e. both serious and minor problems)?
- B3 What evidence or experience do you have to support your views ...?
- B4 Are moisture problems worse in different areas of the UK ... ?
- B5 Is there a particular age or era of houses (e.g. 19th Century, 1960s, post 2000) which have the most serious moisture problems?
- B6 Are there particular types of houses (e.g. solid wall, cavity wall, modern timber frame, park homes, low energy housing) which have the most serious moisture problems?
- B7 Are there particular parts of buildings where there are moisture problems which as yet have not been fully identified or recognised by regulations or policy, and/or which you consider should have more attention paid to them? For example transport of moisture in cavity walls or behind external wall insulation, degradation of ventilation systems
- B8 Are there particular lifestyles where there are moisture problems which as yet have not been fully identified or recognised by regulations or policy, and/or which you consider should have more attention paid to them? For example cooking or washing habits.
- B9 Problems may be of a different nature in non-domestic buildings compared with domestic, and within different types of non-domestic buildings. Which types of non-domestic do you consider to be most affected by moisture problems ...?
- B10 In your experience, what are the main causes of serious moisture problems in existing homes ... ?
- B11 In your experience, what are the main causes of serious moisture problems in new homes ... ?

- B12 In your experience, what are the main causes of serious moisture problems in existing non-domestic buildings ... ?
- B13 In your experience, what are the main causes of serious moisture problems in new non-domestic buildings ... ?
- B14 In your experience, what are the main causes of serious moisture problems in renovated/ retrofitted domestic buildings ...? Please consider the building conditions, the types of materials used and the process of renovation/ retrofit (from assessment through design, construction and use).
- B15 In your experience, is there a particular age or type of property that, following renovation/ retrofit, is more likely to be more vulnerable moisture problems? Please explain why.
- B16 In your experience, which elements of deep retrofit projects are likely to create the highest risk of moisture problems? Please explain why.
- B17 In your experience, following the completion of a retrofit project are there any particular lifestyle or maintenance requirements that you consider will be needed in addition to those expected for non-retrofitted buildings?
- B18 What do you think are most **serious consequences** of moisture problems for the UK ... ?
- B19 What regulatory, demographic, construction practice or lifestyle changes are having the greatest impact (whether beneficial or negative) for moisture in buildings ... ?
- B20 Do you have any views on what should be done, especially for future policy and regulation changes ... ?

B1. Your interest in this subject ...

1. Architect trying to make buildings that work.
2. Architect working on new build and deep retrofit projects Co-chair of TWG 4 on Retrofit
3. Builder and Researcher
4. Comparison of my own experience in the control of moisture and rectification of moisture related problems with the thoughts of others who may approach the issues from a different aspect. I can offer feedback from my experience as a designer, building surveyor and management/inspection of construction, principally residential in nature, and the long term management of the buildings after construction and during occupation.
5. <<Practice name>> are actively involved with diagnosing damp, condensation and mould causation for a host of clients ranging from social housing through insurers to private entities.
6. Damp in historic structures
7. Director of company that produces products and systems for dealing with damp problems in buildings.
8. Having worked for almost 20 years the field of supplying materials, training and guidance for low energy building employing more sustainable materials.
9. Healthy housing for tenants & advice for residential landlords
10. Hygrothermal risk evaluation and appropriate renovation of historic buildings are my specialist research areas. I have written a range of articles, papers and books on the subject. I am <<country name>>'s cooperation partner for the Wufi suite of software applications. I teach <<course>> module at postgrad level (with blended online delivery) focusing on ADT and ABIS moisture issues and a range of hygrothermal risk evaluation methods.
11. I am a lecturer and researcher examining housing performance, including moisture and mould.
12. I am a PhD student and my interest is on mould prevention in historic buildings and affecting historic collections. I focus mainly on strategies to prevent mould development in historic libraries.
13. I handle large insurance claims, on the ground, for our customers involving water leaks and flooding.
14. I have a big interest in these problems.
15. I think deep retrofit is much riskier than many clients appreciate, and ventilation/moisture risk is one of the most risky and most neglected areas. I work with social landlords, and the concern for me is that they think the standard practice they use for day to day retrofit - windows, boilers etc - is adequate for deep retrofit. They are also driven by grant regimes for deep retrofit rather active, professional clienting, so they will seek to mitigate risk in as far as the grant programme acknowledges and pays for it, which is normally quite superficial. They are also generally unaware of Each Home Counts and the current work following that. My interest is in trying to raise the level of clienting skill, ensure we don't put people and properties at risk and shift people towards thinking about value and outcome rather than cost and specification.
16. I'm a historic building consultant and spend much of my time diagnosing and resolving damp problems in traditional buildings.

17. Moisture is the single biggest threat to buildings of all ages and the knowledge around how and why is disparate, with large gaps. It is a subject that needs defining, bringing together, creating a hierarchy, identifying the gaps, and filling them in, priority by priority until we have a whole piece of the jigsaw
18. Moisture risks in retrofit of traditional buildings
19. Mostly theoretical, but I have working relationships with several social landlords and have worked on deep retrofits to EnerPHit standards. I have taken the WUFI course, the AECB CLR course and teach a half day on moisture in buildings.
20. My practice <<name of practice>> worked on a number of retrofits where our experience and our collected data showed harmful levels of moisture in the home environment - derived from a variety of sources. Also, for Good Homes Alliance, we are aware that some sources of excess moisture can also be present in newly built homes and we note that in <<country name>> there are building regulations which address this (...but not in UK).
21. Personal knowledge and betterment for the industry and health of occupants.
22. Philanthropic, scientific, reducing problems, making lives better.
23. <<Company name>> is an international property damage restoration company, working for most of the UK (& European) domestic and commercial insurers. We also design and create specific climate conditions for industry such as controlling humidity in industrial process. As such we are the experts called upon to dry property after tens of thousands of events annually in the UK as well as dealing with floods and other weather events. We have multiple interest in both the current situation and the future challenges arising through the successful management of moisture in buildings, principally of the current stock. This includes both moisture in materials and the environment, but also the potential health impact and liability to insurers, of moisture-exacerbated issues such as mould growth. We also have interest in IoT and are developing solutions that will be incorporated into buildings of the future, to enable continuous condition monitoring.
24. Preventing moisture in new buildings.
25. Professional.
26. Professional and personal (self-build and parent's house).
27. Professional interest Energy and sustainability consultants occasionally advising on retrofit specification for existing buildings, including those with traditional construction. Personal technical/academic interest in affect of internal wall insulation to traditional building stock, and hygrothermal moisture transfer in practice.
28. Relationship to retrofit and the creation of new standards and guidance for PAS2030 and BS5250 as well as directly into Regulatory Standards such as Building Regulations
29. Several year's worth of involvement in the field.
30. <<Voluntary organisation>> chair, I also undertake damp surveys for local people and organisations in Wales
31. The construction and drying from a restoration approach
32. Vetting evidence based on years of experience surveying and valuing homes.
33. We supply a range of water capillary active and moisture vapour diffusion open insulation products for use in solid masonry wall construction.

B2. In your experience what proportion of UK homes do you think experience serious problems of moisture ... ?

1. 30% from a variety of sources
2. 35% which could be much higher in overcrowded rented accommodation or where the occupants can no longer afford the repairs that are needed
3. 4% serious - i.e. severe damp,
4. A few percent
5. at least 25%
6. Difficult to say. Probably relatively few in the scheme of things but most if not all homes are affected by moisture although often not apparent.
7. Do not know
8. Don't know regarding UK Buildings/homes
9. Don't Know.
10. Don't know.
11. For traditionally constructed, solid walled buildings 25%-30%
12. I couldn't say as I haven't been in any where near enough homes to make this judgement.
13. I don't know
14. I don't know.
15. I don't know. Moisture and mould are present in most UK homes to some degree I'd guess, but historically aren't a major problem other than to vulnerable occupants.
16. I would guess one third of the stock
17. I would say 40-80%. Research needed. I suspect that various combinations of fuel poverty, social housing, ill-health, exposure zones 3-4, poor maintenance regimes, sloppy renovations and inadequate insulation and ventilation greatly affect the likelihood of serious moisture problems.
18. I've carried out approximately 40 whole house assessments or other house visits over the last year, mainly in the North West of England - so my data is fairly anecdotal. Out of those 5 had serious problems with moisture. (One a failed CWI install in a coastal location, one a very damp cellar/undercroft with rising damp and rotting floor timbers plus problems at the roof with missing leadwork around a chimney, one cause by under-heating over a prolonged period combined with under-ventilation and penetrating damp through damaged pointing in a solid brick wall, two had failed gutter/failed EWI (<<Town name>> - where lots of other houses also affected)).
19. It is my opinion that approx 15% of homes suffer serious problems.
20. Its very hard to define due to lack of in depth statistical research but I would guess around 15-20%.
21. less 30%
22. Maybe 40% of deep retrofitted properties, 10% of 'standard' retrofits (package consisting of cavity wall & loft insulation, DG windows and new boiler)
23. Perhaps 5%

B3. In your experience what proportion of homes do you think experience any problems of moisture (i.e. both serious and minor problems)?

1. 18% condensation risk and minor mould growth
2. At least 50%
3. Closer to 80%, I see a lot of new build with black mould at window reveal and corners, terrible to see. In older properties well used bathroom facilities where extraction just does not work. Put in by electricians with no idea about effective ducting, need for air to help them work.
4. For traditionally constructed, solid walled buildings 80%
5. I would suggest about 80-90% of dwellings have serious and/or minor moisture problems. If a poll were held in the plenary session of the UKCMB more than half of the people in the room (who are likely to be building professionals or scientists and super-aware of moisture issues) would put up their hand. *I myself have an active moisture policy in my house and excellent ventilation and reasonable insulation yet I have mould in one or two places.*
6. I would think this is much higher, closer to at least 50% if not more.
7. In those same assessments a further 18 had some minor issues - mostly non-permanent condensation on windows/ window reveals or on bathroom/kitchen ceilings. Sometimes resulting in small/non permanent mould spots.
8. Most homes
9. Perhaps 50%
10. This is expected to be quite high, approx 70% when combining minor problems.

Don't know x 7

B4. What evidence or experience do you have to support your views ...?

1. I am aware, particularly in homes in fuel poverty, that moisture issues are present.
2. Based on the number of enquiries coming in to our business and also from a previous job. I am aware of many moisture issues arising from the use of fibrous insulation in brick and block cavities, particularly in regions exposed to wind driven rain. I also have worked with fibre blowing machine suppliers who have had to develop machines for sucking out this material
3. Building Surveyor for 22 years and been in construction industry for 38 years
4. Dialogue with homeowners, builders and professionals over the years as well as my own reading and experiences.
5. <<Company name>> have visited and recorded problems in several hundred homes, majority with draught problems, some with damp mould and condensation problems,
6. Every home I have ever lived in has faced some minor moisture issues, such as minor leaks, condensation and mould. Several homes felt unhealthy in terms of RH levels. Every building I have surveyed has shown signs of moisture issues, such as timber decay. The only problems that clients have raised post completion relate to moisture - both leaks due to defective workmanship (sash as defective flashing or damaged roof membrane following the installation of plant on top) and water escape either as a result of appliance failure (washing machines etc) or pipes that have leaked.
7. Evidence form reported issues on site, social housing and other directly related projects

8. Extensive experience (15 years) of practical repair & maintenance on buildings of all types, and 10 years auditing/inspecting buildings as part of retrofit programmes.
9. I am citing from data in the report "Health and Moisture in Buildings".
10. I deal with a lot of older properties that are experiencing damp issues, but I also notice mould in new houses as well.
11. I have attended 1000s of properties, been to many seminars about dampness in buildings, read industry literature and take an interest in the subject
12. I have done primary and secondary research that supports the views above. I have surveyed hundreds of houses, I have installed monitors in of ventilation systems, I have carried out hundreds of moisture risk assessments. However I have not done a meta study or been part of a large scale formal study to ascertain such data.
13. Literature review / well read in this area and also worked as an assistant B&CE engineer for an establishment works consultants for the MOD for several years and since then as an energy assessor, thermal modeller for an insulation manufacturer for 13 years.
14. Most homes lack good facilities to properly heat and ventilate them in order to control the moisture within them. This is often due to inadequate heating, ventilation and thermal insulation in older properties. In newer properties designers often provide systems to achieve good energy ratings for building regulation approval without considering the understanding or willingness of the occupants to properly operate the systems provided, particularly if those systems require the occupants to do, or not do, certain things to achieve the intended performance.
15. My views are based on the places I have lived in (from damp Victorian houses and over-dry tower block flats), stories I have heard and buildings I have surveyed (both non-invasive and fully opened up). I often walk into Victorian houses and can pick up a faint smell of damp - I wish I had a rot-hound or device that could confirm (and pinpoint!) my suspicion that there are "serious" problems lurking somewhere.
16. None - just gut feeling. Most homes have some areas of mould growth
17. Personal experience of my own homes, some small investigation of moisture issues in the English Housing Survey
18. Personal experience where the vast majority of places I visited have damp issues.
19. The percentages I have given are based on personal experience as a consultant, mostly in social housing.
20. This is based on observation from my conservation practice and general personal experience. There is a significant qualification needed, in that I disproportionately experience buildings with problems. I've tried to factor that into my answers.
21. We have many EWI complaints and approximately 20% of these relate to condensation and not the installation. A further 5% had EWI added to "solve" the problem, which we know does the opposite. Mis-selling is still an issue for desperate home owners hoping to stop damp
22. We have undertaken numerous surveys for the clients listed above and our figures are based on the quantity of surveys within each sector.
23. What I have encountered in my work as a building surveyor
24. Working knowledge of the UK housing stock. The previous questions are difficult to answer without reference to a time scale. I would say that a significant proportion of houses will suffer from serious damp problems during the lifetime of the building and these are most likely to occur during periods when the building falls into disrepair. If one includes all damp problems, including escape of water from plumbing etc... then virtually all buildings are likely to suffer from dampness at some point during the lifetime of the building.

25. Working with colleagues in maintenance, visiting tenants when I was working on the Decent Homes Programme. This is still very finger in the air in my part though, please don't treat as a scientific estimate.
26. Working within the industry. Visiting friends & Family. Observation from working down the street.

Years of surveying and valuing home

B5. Are moisture problems worse in different areas of the UK ... ?

1. Areas of high exposure certainly seem to fair considerably worse. This can be due to local differences in micro climate as well as regional differences.
2. Areas of high exposure should be more at risk from penetrating wind driven rain. Certain areas also have different types of stock.
3. I assume so - location is a factor when other factors are present.
4. I believe that Cornwall has a higher than average prevalence of damp homes, there being a high proportion of solid-walled buildings. Other contributory factors no doubt include the (i) low socio-economic status (SES) of a large number of resident householders and (ii) climate. SES Large numbers cannot afford to get on to the property ladder, contributory factors including (a) low levels of industry (which is over-reliant on seasonal tourism), and a shortage of affordable homes; this is partly due to the large numbers of second homes which push prices up. People are forced to rent, with the data from the English Housing Survey showing higher levels of dampness amongst tenants' homes. Climate-- Clearly, as the most westerly county in England, levels of driving rain are higher here than elsewhere in the country.
5. I believe that moisture problems will be worse in areas of high rainfall and wind-driven rain. Serious moisture issues will be present in areas at risk of flooding.
6. I suspect that various combinations of fuel poverty, social housing, ill-health, exposure zones 3-4, poor maintenance regimes, sloppy renovations and inadequate insulation and ventilation greatly effect the likelihood of serious moisture problems.
7. I would anecdotally say no, anywhere where overcrowding, poor ventilation, low or no maintenance and a fear of bills from running extract or heating
8. I'm mainly based in NW England, so generally damp. Would be good to know if things are very different in East Anglia!
9. Probably not but more likely to be worse the further north you go as it is colder and more stone used in construction
10. Those with flooding risks, those with particularly high levels of driving rain / more exposed.

B6. Is there a particular age or era of houses (e.g. 19th Century, 1960s, post 2000) which have the most serious moisture problems?

1. 1960s - 1980s seem worst for internally generated moisture loads, traditional buildings badly maintained are worst for moisture ingress from outside and occasional rising damp (due to incorrect ground levels and saturation due to faulty rainwater goods or abutting walls etc).
2. All types
3. Certain types of dampness are more likely to affect houses of certain eras. Solid-walled properties typically built >100 years ago are more likely to suffer from structural forms of dampness such as rising damp or penetrating damp. They were commonly built without

a DPC. Porous lime mortars and under-fired bricks were often used etc... In more modern housing stock, condensation tends to be the dominant form of dampness.

4. General observation would be flats. always seem to lack ventilation
5. Generalisation the older the worse but there are lots of exceptions
6. I believe that properties prior to 1960 are more susceptible to moisture risk due to the layout lack of proper heating, and ventilation systems
7. I think 'old = hard to heat / problematic' is greatly over-stated. A lot of old buildings have been treated appallingly which has made them respond badly to the modern heat and moisture levels we impose (partial renovations, poor maintenance, walls covered in PVA then acrylic paints applied reducing moisture buffering capacity, pavements raised, etc).
8. I would say it exist in all. Old buildings suffer from moisture problem as well as new built (especially the air tight ones)
9. I would say the issues are more pronounced in houses built in the last quarter of the 20th century, and in particular older buildings which have been in appropriately upgraded without due care for ventilation, thermal compatibility and continuity etc
10. I would think 1970s would be the worse, followed by system built homes of 1940 and 50s, then the older solid walled houses.
11. In general yes, pre-19th Century but non exclusively. Interventions carried out to any building can create "serious" moisture problems.
12. In my experience, solid wall properties suffer very easily but partly because fuel poverty has a disproportionate impact. Flats in high and mid rise (partly due to nature of ventilation, but also because ducts etc have become blocked over the years).
13. Moisture problems will be present in all buildings, but their causes may be different. It is perhaps more prevalent in older buildings, where it is likely going to be due to condensation from poorly insulated windows, moisture ingress through solid walls, interstitial condensation in internal solid walls. Older housing may not have adequate foundations, and can experience moisture from the ground. More modern housing, it may be due to greater airtightness and insufficient removal of water vapour
14. No
15. No - it is linked to all properties as it is influenced by the use of the building by the occupants
16. No, I don't think so I believe it is all dependant on location amount of occupants condition of the building and how people live in the current generation.
17. No. it is more to do with how people live in their houses. There is a very high percentage that do not ventilate their homes in any way because they think that to do so will waste heat and the cost of producing it. This extends to disconnecting extractor fans, blocking air bricks, preventing cross flow ventilation in roof spaces, closing up chimney flues and many more examples.
18. No. I've seen problems in all ages of houses - and of the three ones with serious issues mentioned above, one was 1890s, one 1920s and one 1970s.
19. Not really. The problems are caused by numerous variables. While some concrete houses from the 60s may be prone to condensation issues by virtue of good air tightness and poor u-value, that problem may only be apparent if the occupancy is high. All buildings have their weak areas. These can be made problematic by i under ventilation ii under heating iii over occupancy iv lack of maintenance v lack of occupant understanding vi particular microclimate vii poor quality of original construction.
20. Older properties tended to have natural air flow through them due to their construction whereas latter day properties have insulation elements added as standard. The addition

of these elements to older properties has also served to encourage problems that previously didn't exist.

21. Our claims span all era's of housing stock. Modern construction has better ventilation, trickle vents on windows, extraction fans in bathrooms & kitchens, etc which day by day appear to better manage moisture levels to a happy equilibrium. This would lead me to consider that older housing stock may suffer more with moisture problems where ventilation is not designed into the structure.
22. Poorly insulated / unable to afford to heat ones; poorly ventilated; poorly maintained; Unprotected (those without sufficient external cladding approaches to reduce the effect of driving rain. This can be the case across a large variety of ages.
23. Poorly insulated homes ie pre-2000 are prone, although super-insulated (new) homes can be problematic if the performance gap causes defects and other factors present.
24. Pre-1919 because of construction defects and leaks. 1960s-1970s system built because of poor insulation and thermal bridging
25. The answer depends on many factors as even an older property with damp walls and draughts can be made to feel comfortable but it may take a lot of heating in the winter time to achieve this. *For example I grew up in a four hundred year old thatched house with a Rayburn (type of Aga) which was lit all day and with open log fires in other rooms and walls with rising damp but it felt cosy.* *** People generally will not run heating all day so as to save costs so older poorly insulated homes are at the greatest risk of moisture problems.

Don't know x 5

B7. Are there particular types of houses (e.g. solid wall, cavity wall, modern timber frame, park homes, low energy housing) which have the most serious moisture problems?

1. 1960s-1970s system built (high and low rise) 1960s to 1980s traditionally built
2. Again not really. But there may be coincidences of variables that produce especially risky conditions. So a super low energy target combined with vapour tight construction that has only one membrane on the outside and a poorly installed vapour control layer (VCL) on the inside around a complicated geometry....Such conditions would increase the risk of failure and probably catastrophic failure. The archetypal flat roof extension is often subject to many of the above.
3. All types but evidence that those with cavity walls that have been incorrectly insulated are exhibiting problems with damp & mould growth which did not previously exist.
4. Cavity and timber frame
5. Cavity wall after having the cavity filled
6. Cavity wall, timber frame and "low energy" housing
7. General observation would be flats. always seem to lack ventilation .
8. I don't think I have enough data to say - have seen issues in everything from Georgian terraces to 1990s flats.
9. I think the key issue is about condition and actions, not typologies. Solid wall (including modern hollow and solid concrete blocks) may be most likely to have low surface temperatures. Cavity wall may be structurally vulnerable if poorly built. Timber frame may be most hygrothermally vulnerable is built or renovated poorly. Low energy housing can be most vulnerable to poor indoor air quality (IAQ).

10. I would say solid wall, cavity walls, but it could span over many forms.
11. In general solid wall but ... not exclusively.
12. No
13. Not from my experience.
14. Poorly insulated / unable to afford to heat ones; poorly ventilated; poorly maintained; Unprotected (those without sufficient external cladding approaches to reduce the effect of driving rain. This can be the case across a large variety of types.
15. Poorly maintained homes are probably the worse, but with types /i would think that cavity and solid walls are the worse.
16. Serious problems stem from a host of issues including their use as well as structural elements therefore, it is my opinion that all properties have the potential to suffer the same problems.
17. Solid wall (more specifically rubble walls), brick and block with fibrous insulation in the cavity. Loft spaces where the householder has blocked off the eaves ventilation or boarded over the loft
18. Solid wall concrete panel (ranges from high rise to Tarrans bungalows)
19. Solid wall houses are more at risk of moisture problems due to their cold surfaces and possible moisture penetration from rain.
20. Solid wall, stone construction, unfilled cavity
21. Solid walled houses tend to suffer most from rising damp and penetrating damp.
22. System builds and park homes, poorly maintained solid wall.
23. The issues are across the whole building typologies in the UK.
24. Timber frames have an elevated risk due to the damage moisture may cause for mould growth, degradation, and wood warping. Damp risks will exist in all dwellings that do not have a design appropriate for the surrounding conditions.
25. Traditional solid wall houses where there is external vapour impervious render and/or paint coatings and to some extent hard cement and not lime pointing to masonry joints suffer particularly from interstitial condensation. This is due to the inability of the fabric to allow vapour to escape to the external air.
26. We focus solely on solid walls so response would not be useful comparison
27. Whilst I am familiar from the literature that dampness can cause problems in different types of housing, in my own experience I have mostly come across it in solid-walled houses built in the 1930s or earlier.

Don't know x 4

B8. Are there particular parts of buildings where there are moisture problems which as yet have not been fully identified or recognised by regulations or policy, and/or which you consider should have more attention paid to them? For example transport of moisture in cavity walls or behind external wall insulation, degradation of ventilation systems

1. Bathrooms, projections, eaves box areas
2. Blocked vents under suspended ground floors. Incorrect ground levels. Yes to cavity walls with faults in external skin - the cavity was generally designed to be ventilated - so no surprises there.

3. Cavity wall insulation (injection type) often is over looked when drying buildings and will likely bridge moisture between the external and internal skin of a standard constructed brick/block home.
4. Certainly the recent issue of 'reverse condensation' in cavities has become more prevalent and can align itself to learning more about cavity wall insulation techniques and types of buildings to install it into.
5. Complex junctions (not simply 2D scenarios), ventilation below suspended timber floors, overheating of roof spaces. What condition a building should be in before any works are allowed to be carried out.
6. Condensation and mould growth due to inadequate ventilation. Water penetration behind EWI Condensation behind IWI (particularly thermal laminate board linings)
7. Conditions in super-insulated attics (expanding the Swedish study to British Isles). Moisture conditions within internal and external walls of fully tiled wet rooms. Under floor voids. The interaction between solid walls and modern solid floors with damp-proof membranes (DPMs).
8. Degradation of MVHR
9. Degradation of ventilation systems as mentioned above in connection with high rise. Soaking cavity wall insulation which is only noticed when it expresses itself on internal walls Degradation of integrity of EWI - lack of client awareness and skill in recognising this risk
10. Failed Cavity Wall Insulation a big issue - especially on western coasts. Lots seems to have been inappropriately installed. Links of ventilation and moisture problems understood by some but not all - improving, but still not there. Moisture transport generally not well understood.
11. I would say interstitial condensation within the fabric is not adequately addressed, maintenance of ventilation and thermal bridging related moisture issues too. Another major moisture risk is site moisture during the building phase when buildings are exposed and when wet trades are adding water to the fabric.
12. Mineral fibre in brick and block cavities. Gable walls on rubble houses (many of these walls used to be lime rendered hundreds of years ago, but building control offer don't believe this and won't give consent to lime render externally).
13. Opinion varies even amongst experts as to whether filling cavity walls is a good idea, although landlords are forced down that route by restricting Lettings where an EPC fails to meet E or above
14. Problems to parts of homes with cavity walls caused by voids or breaks in insulation, debris in cavity, unsealed or unsleeved vents creating cold bridges or means of rising or penetrating damp.
15. Rain penetration in general is poorly covered by regulations. This is probably because of the large number of potential moisture pathways and defects that can cause the problem. BS8104 is out-dated and over-complicated. It would be great if someone could make an app that could work out the complicated algorithm to allow wind driven rain exposure to be calculated for individual properties.
16. Relative to other countries, there is very little attention paid to the need for maintenance in the UK - i.e. clearing gutters and drains. People are often conscious of the risks from internal solid wall insulation, but choose to rule it out rather than evaluate the risks. Inappropriate internal surface materials may cause problems because of their moisture buffering capacity
17. Soakaway drains where rainwater is channelled directly into the ground from downpipes can cause long-lasting dampness in solid underground walls and result ensuing rising damp. My parents' home suffered from just such a problem, and I have noticed a

persistent smell of mustiness in other bungalows along the road. The problem may be (partially) remedied by filling in the soakaways with sand & cement and directing rainwater farther away from the house. Householders are unaware of the cause of the dampness. Whilst blocking up the soakaways may solve the problem for the householder, it no doubt contributes to the overload of storm drains (and consequent flooding) if the rainwater is directing on to a hardstanding, which is often likely to be the case.

18. The traditional wet rooms I do not believe suffer from major problems if purge extract is installed. The circulation spaces and the main living rooms are where the bulk of the problems exist, due to under heating and lack of adequate background ventilation.
19. The worst affected elements are traditional solid external wall that have been sealed externally by impervious coatings and even restricted by impervious cement pointing to mortar joints. This prevents water vapour moving through the walls to the external air. Much of the problem is due to a lack of knowledge amongst builders and professionals as to how modern materials are not always appropriate to be used on traditional buildings and fabric.
20. There are 2 building elements that are critical to moisture problems and tend to degrade in service rainwater goods and ventilation. Even if the initial specification and installation is adequate (questionable even for ventilation which does have regs) they rarely function optimally for long. There is no requirement for ongoing maintenance, monitoring etc.
21. There is insufficient advice on ventilation. Building Regulations set out systems that are acceptable for new build or refurbishment but it is left to the designer to make the selection. There should be more information on when it is considered necessary to have continuous ventilation in preference to intermittent. For example in building which have vapour control layers in floors, walls and ceilings the structure cannot breathe so moisture removal has to be via the ventilation system and in such cases intermittent ventilation maybe insufficient to keep the internal environment healthy.
22. Thermal bridges, around poorly maintained elements, issues around thermal improvements.
23. Transport of moisture in cavity walls and also poor installation of retrofit additions
24. Ventilated floor voids and ventilated cold roofs are not adequately understood in my view. Nor is the phenomena of rising damp!
25. Verge trims are a particular issue, flashings around chimneys, gutter going into downpipes that cannot cope during rainstorms now experienced. Removal of grass and replacement with higher, often, angled back decking or paths lead both to problems in the property and, when aggregated, flooding. Blocking of vents from plant life, or home owners internally, laminate floors removing floors breathing. Most extract fans I come across have been installed by an electrician, who have little idea about the issues of layers of flexible

Don't know x 6

B9. Are there particular lifestyles where there are moisture problems which as yet have not been fully identified or recognised by regulations or policy, and/or which you consider should have more attention paid to them? For example cooking or washing habits.

1. All need to be reviewed but education of occupants is a major issue
2. All!
3. Clothes drying, occupancy, cooking styles, washing.

4. Cooking, washing etc. allied with lack of ventilation
5. Density of occupation probably more significant than particular habits/lifestyles. So can be more of an issue in smaller socially rented homes, where bedroom tax is forcing this and times of occupation may be extended (e.g. elderly/retired).
6. During clothes indoors i Cooking without lids on pans ii Over-occupancy iii Under-heating due to fuel poverty
7. Drying clothes internally, several members of same family using same bathroom where extract nowhere near sufficient to remove moisture. All holes, gaps around under doors blocked up with draft excluders and chimneys have balloons in them to stop drafts. As the issue is always about cost of heat, home owners do what it take to stop this escaping.
8. Drying washing indoors, tenanted properties
9. Fuel poverty is obviously a huge underlying problem with many condensation and mould issues. If people can't afford to turn their heating on at all, they are likely to get mould problems irrespective of how much insulation and ventilation you throw at the problem.
10. High occupancy rates combined with occupants remaining at homes all day as found within the social housing sector can lead to higher moisture loads. This couple with under heating and ventilation can start to tip the moisture balance. Some medical conditions can also require frequent bathing.
11. HMO ¹ - where we have a higher head count in a house and more prolific usage of bathing facilities does increase moisture levels.
12. I believe that opening windows (especially when drying clothes) and under-heating are exceedingly important. *I cite the example of a house which we have been renting out out for decades without any signs of dampness to different tenants over the years. A recent tenant started to experience very bad dampness and the mould in the kitchen. A single man, working irregular hours, we believe that the problem resulted from the fact that he simply did not heat the house sufficiently, his reasoning no doubt being "Why heat any other room than the room I am currently in?" When questioned about his heating of the house and use of the ventilation fan in the kitchen, he claimed that he heated the kitchen and ventilated the kitchen. He clearly did not. It also illustrates the difficulties of relying too heavily upon householder surveys when admitting to the truth may result in some kind of embarrassment (eg poverty (or meanness in the case of our tenant). It is easier to look to place the blame elsewhere.*
13. I would say generally occupants habits
14. Lifestyles are so very different that it is difficult to design for. But having worked for 13 years with one of the larger housing associations one learnt to design for the most challenging lifestyle. These were where occupants would not operate complex controls for heating and ventilation, would not open windows, would seal over trickle vents and turn off electrically operated ventilation systems in the mistaken belief that they were using electric so were expensive to run. The consequences of such actions meant that internal environments could quickly become unhealthy. *I have heard that some housing associations who fitted MVHR systems, for energy efficiency, have experienced very bad condensation problems due to occupants turning off the systems and then having no ventilation, including no background ventilation. Is this the fault of the occupants or the designer for not anticipating the occupant's behaviour?*
15. Lofts - many people block off ventilation
16. Long showers, lack of using extract fans when cooking or showering, and drying laundry indoors

¹ HMO (House in Multiple Occupation): a house occupied by more than 2 qualifying persons, who are not all members of the same family.

17. Most regulations do not take any account of how people really live their lives in their homes. There seems to be an idealised image as to how people live or that they have read some sort of manual as to how to do so. A far more realistic approach should be taken when developing any new regulations or reviewing existing ones and that should be based on a detailed study of how people actually live and behave.
18. People spending more time in buildings generating more moisture through lifestyle, such as cooking, exercise, washing etc.
19. Regulation places responsibility on landlords to ensure properties are safe, where lifestyle is the issue however, there is little that can be enforced on tenants who fail to understand or cooperate
20. Simple things like taking a shower in the south-facing (or windward) bathroom with bathroom window and door open. *How house pride and a desire for cleanliness (multiple clothes washes, frequently washing floors and walls) can have the unexpected result of mould growth and poor IAQ things many of us erroneously think must be a result of lack of care and self-respect.*
21. There is a lack of awareness about how much moisture people and activities produce, but the challenge is getting people to believe you. *In many cases they are looking for a physical cause - eg leaks, poor quality work - when in reality it is often poor design interacting with occupant behaviour. But occupants rarely want to listen to how they can be part of the solution. I have tried to convince tenants with uncovered fish tanks that the water evaporating daily from the tank is a considerable part of the condensation issue they were having, to no avail.*
22. This is an ongoing issue as we regularly come across such problems when dealing in particular with the Social Housing Sector. The identification will be required for understanding more the ability to expel produced moist air in kitchens and bathrooms and understanding when that has been accomplished.
23. This would also be the increase in occupant through new babies or relatives coming to live or even the increase of pets
24. Yes - drying habits mainly. Not uncommon to find driers not venting to outside. Also cooker extractors not vented to outside - just filtering. Washing drying on radiators is incredibly common.

Don't know x 3

B10. Problems may be of a different nature in non-domestic buildings compared with domestic, and within different types of non-domestic buildings. Which types of non-domestic do you consider to be most affected by moisture problems ...?

1. Anywhere with high humidity, poor maintenance regimes etc.
2. Basement areas of commercial buildings, kitchens, etc...
3. Churches and courtrooms where large numbers of people release a large volume of moisture and heating is similarly limited.
4. Churches, or even commercial premises which were once domestic?
5. From work experience I can say that most historic buildings, such as those of the National Trust, are affected by moisture problems in some way. But I am not able to compare the to other types of non-domestic buildings.
6. High humidity environments - Swimming Pools; Breweries; Kitchens etc.
7. High moisture load buildings are highest risk, such as high activity buildings, swimming pools and offices with high occupancy like call centres.

8. I recently became aware that using precast concrete hollow core planks often gives rise to moisture problems as they dry out post construction.
9. Mainly the rented sector - where businesses struggle to survive, repairs to buildings are very low on the list and landlords are not interested.
10. My own role only has me dealing with insurance claims for domestic homes, I have no commercial experience.
11. Older converted leased properties generally occupied by SMEs where maintenance and upkeep of a leased property is down to an unconcerned landlord .
12. Older public buildings with multi occupancy - schools
13. Older solid walled and single glazed industrial buildings with wet manufacturing processing would be at highest risk of moisture problems.
14. Period properties suffer the most issues as they tend to exhibit long term damp related issues. Whilst this is not uncommon in these types of buildings, understanding its age, construction and ability to deal with expected damp is paramount.
15. Poorly maintained traditional buildings without trained/experienced building managers. Professional kitchens, swimming pools and fitness centres, gardening centres and schools.
16. Schools, restaurants, hotels (especially 19th century ones), washing facilities
17. Swimming pools
18. Swimming pools are a major challenge. *In my youth I remember seeing the internal timber cladding decay as I grew up. The recent fashion for exposing timber structures enclosing pools seems dangerous to me.* Other extreme environments such as saunas, ice rinks most be challenging too. Buildings that have various occupiers pose challenges too, such as schools that may be closed over a season. Short terms lets also pose risks as the users may have no understanding of the environment they are in and may treat it without care or regard (rather like a 'hire car') Plumbing leaks.
19. Swimming pools, gyms with showers
20. There is not much difference between types of non domestic buildings in respect of damp. It all comes down to how they were built in the first place and how they are maintained. The main difference is between those that are owner occupied and those that are rented where the latter are usually worse maintained and therefore prone to damp than owner occupied who have the vested interest of maintaining capital values rather than gross rental income.

Don't know / not sure 5

B11. In your experience, what are the main causes of serious moisture problems in existing homes ... ?

1. Cold bridges, poor ventilation, poor levels of heating
2. Combination of occupants behaviour and moisture being trapped
3. Condensation and mould due to under-heating as a consequence of fuel poverty. Inadequate, badly maintained or disabled ventilation systems. Drying laundry indoors.
4. Evolving problems with incorrect installation of cavity wall insulation.
5. Faulty rainwater goods are disproportionately the main cause I experience, followed by inadequate ventilation. Specifically for traditional buildings the next main cause is the incorporation of inappropriate building materials.
6. General lack of maintenance.

7. I believe that a combination of inadequate heating and poor ventilation in alliance with the householder's failure to understand their importance. I consider the interaction of these three to be most important. The problem is made all the worse because the householders do not think that such simple things as opening the windows and heating the house can really make a big difference. *In another timber-framed house rented out, recent tenants also started to experience dampness where the house had been dry for years before. We believe that this resulted from the fact the the occupants did not ever leave the relatively newly-installed windows (lacking window vents) open on the secondary latch, for fear of "throwing heat out of the window".* People want high tech solutions, the letting agent want to have mechanical ventilation installed! Another tenant sealed the kitchen fan vent to prevent heat losses. Tenants, often on low incomes, try to save on heating, but in so doing create problems of dampness.
8. Inadequate ventilation is the most common in our experience.
9. It is more to do with how people live in their houses. There is a very high percentage that do not ventilate their homes in any way because they think that to do so will waste heat and the cost of producing it. This extends to disconnecting extractor fans, blocking air bricks, preventing cross-flow ventilation in roof spaces, closing up chimney flues and many more examples.
10. Lack of adequate ventilation / Lack of moisture extract. Lack of good maintenance. Especially rainwater goods and drainage. Lack of Insulation / ability to heat the home for reasons of cos. Poor junction detailing. Inadequate external drainage provision
11. Lack of heating and ventilation
12. Lack of ventilation and low surface temps. Cooking, and cleaning also.
13. Leaking pipes (heating and mains water). Leaking showers. Leaking rainwater pipes. DPC/DPM failure. Drains backing up. Flooding. Inadequate ventilation.
14. Moisture generation and inappropriate use of equipment to deal with it
15. Occupant behaviour, "perceived cost to ventilate and heat" cost and understanding of maintenance.
16. Plumbing leaks. Roof/ valley gutter leaks. Leaks around windows. Moisture ingress due to moist ground behind retaining structures. Severe cold bridging.
17. Poor maintenance - seals around windows, flashings around chimneys, incorrect ground levels internal poor occupant behaviour (though not poor but logical if you have no other way to dry clothes), inadequate ventilation in postwar homes
18. Poor maintenance leading to moisture ingress and failure to adequately remove indoor moisture
19. Poor maintenance, guttering and penetrating damp associated with inappropriate material selection e.g. renders etc.
20. Poor maintenance, inadequate ventilation, poor construction were old meets new and poor occupant knowledge
21. Poor occupant behaviour Inadequate Ventilation
22. Poor occupant behaviour
23. Poor ventilation caused by blocked trickle vents, windows that do not stay open easily for ventilation, recirculating kitchen extractors (that people think are extracting!), occupants not aware of need to ventilate, thermal bridges in construction, heating systems with no or poor controls, poor maintenance (in particular related to rainwater management), fuel poverty creating extreme cold spots behind curtains/furniture.
24. Poor ventilation, poor maintenance - e.g. of guttering. Temperature within the home too low,

25. Poorly thought through design and (connected with this) poor client competence. There is simply too little awareness in large client groups of the risks of deep retrofit, and investing in training (eg retrofit co-ordinators) is seen as an expense rather than an investment in managing risk. The costs of poor retrofit are absorbed in day to day revenue expenditure, with no-one linking back effect to design, construction and site supervision, so the costs are hidden, unlike capital costs which are driven down. Minimum regulatory standards are used almost exclusively as the driver for practice and outcome. So poor clienting is the main cause, with the list you have given being the outcomes from this.
26. Replacement windows with no consideration of ventilation strategy. Shower rooms with poor ventilation and lots of cold surfaces Existing windows with very poor thermal performance and chronic condensation coupled with no maintenance. Poorly weathered door thresholds Impermeable external landscaping dressed up to the building + building levels.
27. Retrofit works
28. Varies - Cold temperatures combined with poor ventilation definitely biggest impact on the more minor problems.
29. Water penetration through solid walls or poor damp proofing at ground level in older houses. *** Surface condensation and mould associated with high humidity levels within a property associated with poor heating and ventilation. This can be particularly problematic behind furniture placed against a cold external wall.

Don't know x 3

B12. In your experience, what are the main causes of serious moisture problems in new homes ... ?

1. Air tightness
2. Burst pipes - alleviated fairly quickly through repairs and allowing to dry / dehumidifiers where necessary. Building Quality defects - poor workmanship (especially poor detailing). Flood risk.
3. Condensation and mould issues cause by lack of air movement.
4. Failure to remove moisture generated indoors from more airtight homes, and poorly designed or installed MVHR
5. Footprint too small for number of occupants, drying of wet items inside, vapour from occupants in small double bedrooms stacked with furniture
6. I don't see that many new homes but from limited experience badly installed ventilation systems - cheap extractors, flexi-hose ducting.
7. In Sweden one big problem is moisture in concrete floors
8. Insulation issues
9. Moisture generation and inappropriate use of equipment to deal with it
10. Not qualified to answer - though building in wet conditions must trap some moisture
11. Pipe work leaking. Flooding. Plumbing leaks. Roof/ valley gutter leaks. Leaks around windows. Inadequate ventilation (natural and mechanical)
12. Poor construction, thermal bridging , inadequate or more commonly non existent ventilation systems
13. Poor detailing and workmanship regarding the design and installation of cavity trays and DPC's at roof abutments and around window openings. Turning off MVHR ventilations

system and then having no alternative ventilation method other than opening windows. Providing vapour control layers (VCL's) in all external walls, ground floors and ceilings under roofs, this forms a plastic bag type environment, coupled with not providing a suitable ventilation system to remove harmful water vapour created by the occupants and their activities.

14. Poor detailing by designers, very poor construction standards and the lack of ventilation provision due to the need to make houses as air tight as possible. That is exacerbated by the lack of guidance / instruction given to new and successive occupants on how to live in their houses and how to operate them. The average person will assume that they will live in a new house in exactly the same manner as an older house.
15. Poor occupant behaviour Inadequate Ventilation
16. Poor ventilation strategies, cold bridging, occupant behaviour
17. Poorly designed ventilation systems. Sometimes no design and heavy reliance on intermittent bathroom extract fans installed for 'compliance'. Trickle vents not sized or not achieving free area claimed. Flow rates not checked on site, flow rates affected by installation (e.g. flexible ductwork and back pressure). Where full mechanical systems are specified residential buildings suffer from very poor mechanical design, there is a clear split in quality between res/non-res. Design flow rates are sometimes not possible to achieve with the fan and duct sizes specified. Installation is similarly poor. There is often no commissioning or ineffectual commissioning at 'boost' rate. Chronic thermal bridging, usually from steelwork e.g window lintels for large openings. Rooflight installation details.
18. Poorly installed ventilation systems, poor quality in construction introducing cold bridges
19. Property-poor ventilation, over insulated and over occupied
20. Retrofit works
21. Site moisture which hasn't dried out.
22. The APPG Excellence in the Built Environment reports More Homes Fewer Complaints (2016), Better Redress for Homebuyers (2018), the Farmer Review - Modernise or Die (2016), Organisational Resilience (Project 5 & Constructing Excellence, 2018) - these all capture the culture of the construction industry, but they survive despite this culture because it is a sellers market. So it isn't about the individual measures/factors that cause moisture, it's about retail buyers who are obliged to buy poor quality homes from a compliance-driven construction industry, and corporate clients (again social landlords, local authorities, with few exceptions) that are not technically competent enough to recognise and mitigate risk - primarily performance, overheating, ventilation and moisture - in the homes they commission.
23. Uncontrolled moisture in building elements, poor VCL continuity, cold bridges, lifestyle factors
24. Utilising the existing ventilation measures and understanding the importance of a balance of heat and ventilation to maintain optimum internal atmospheric conditions.

Don't know x 3

B13. In your experience, what are the main causes of serious moisture problems in existing non-domestic buildings ... ?

1. There is not much difference between types of non domestic buildings in respect of damp. It all comes down to how they were built in the first place and how they are maintained. The main difference is between those that are owner occupied and those that are rented where the latter are usually worse maintained and therefore prone to

damp than owner occupied who have the vested interest of maintaining capital values rather than gross rental income.

2. Cold bridges, poor ventilation, leaks
3. Converted domestic to a commercial, older building being internally fitted to hide old or existing problems
4. Drainage and roof leaks, ventilation. See also comment about churches and courtrooms.
5. Inadequate Maintenance / failure to repair. Otherwise as with domestic.
6. Intermittent heating, lots of vapour from occupants, poor maintenance
7. Issues with heating systems; raising damp; leaks.
8. Lack of understanding of the problem Lack of ventilation and low surface temps. Over occupancy and lack of moisture balance.
9. Leaks
10. Most are structural ingress issues either by breakdown of original as-built criteria or the implementation of latter day damp remediation techniques that may not have been suitable or indeed, installed correctly.
11. Over occupancy not originally considered at design stage.
12. Plumbing leaks. Roof/ valley gutter leaks. Leaks around windows. Cold bridging.
13. Poor building management, ramshackle building services, lack of serious maintenance.
14. Poor insulation and lack of maintenance
15. Poor maintenance
16. Poor maintenance mainly, especially in the private rented sector
17. Poor maintenance, inappropriate materials on repairs / improvements
18. Type of business (i.e. generating excessive moisture without suitable means to get rid of it)
19. Various. Depends on the use of the building - e.g. office vs restaurant vs factory

No comment x 10

B14. In your experience, what are the main causes of serious moisture problems in new non-domestic buildings ... ?

1. All the above (i.e. lack of ventilation and low surface temps, over occupancy and lack of moisture balance) along with site moisture built into the fabric.
2. Burst pipes - alleviated fairly quickly through repairs and allowing to dry / dehumidifiers where necessary. Building Quality defects - poor workmanship (especially poor detailing). Flood risk.
3. Change of use and over occupancy with no built in capacity for change
4. Depends on which commercial use.
5. Drainage and roof leaks, ventilation.
6. In our experience we have only dealt with typically plumbing issues in new non-domestic buildings or construction defects (for typically NHBC)
7. Occasional bad detailing.
8. Plumbing leaks. Roof/ valley gutter leaks. Leaks around windows. Cold bridging.

9. Poor design, underestimation of storms (1 in 100 storms now 1 in 10 or less). Lack of good detailing at key interfaces, no redundancy built in
10. Poor detailing by designers, very poor construction standards and the lack of ventilation provision due to the need to make houses as air tight as possible. That is exacerbated by the lack of guidance / instruction given to new and successive occupants on how to occupy in their buildings and how to operate them. The average occupant will assume that they will use in a new building in exactly the same manner as an older one.
11. Poor insulation, over-populated and poor ventilation
12. Poor maintenance
13. Poor specification and design
14. Same as above (i.e. type of business (generating excessive moisture without suitable means to get rid of it) with the added air tightness. Also when fit outs are left to occupants, the moisture consideration is usually overlooked.
15. Uncontrolled moisture in building elements; cold bridges

Don't know / no experience 14

B15. In your experience, what are the main causes of serious moisture problems in renovated/ retrofitted domestic buildings ...? Please consider the building conditions, the types of materials used and the process of renovation/ retrofit (from assessment through design, construction and use).

1. Bad placement of insulation (i.e. internal, external etc.) without tackling moisture
2. Builders not understanding the effects of moisture and failing to fit suitable materials , either cheap or not up to the job if every day living and not allowing plenty of ventilation.
3. Failure to remove indoor moisture
4. I can't comment on this level of technical detail, I can more see how the client culture creates the conditions for poor outcomes.
5. In traditional buildings the use of vapour closed insulation material; increased airtightness allied to poor ventilation; bad design / detailing / workmanship; too much insulation reducing heat flow in solid walls and inhibiting evaporation.
6. Inadequate insulation
7. Inadequate ventilation following reduction of the infiltration rate by insulation and/or draught-proofing. Rainwater penetration behind external wall insulation (EWI) due to poor detailing or installation Rainwater penetration due to inappropriately installed cavity-wall insulation (CWI).
8. Inappropriate materials which are not compatible with the structure. A lack of understanding of the main moisture drivers into the structure. A lack of "systems thinking" i.e. build tight, vent right. Thermal bridging, etc
9. Inappropriate survey and design, then supervision of installation
10. It is my experience that incorrect installation of measures designed to alleviate damp is possibly one of the main causes.
11. Lack of adequate ventilation and cold bridges. I would suggest that one of the most common problems related to moisture in social housing is mould growth on walls which can often be solved by improving ventilation or increasing the temperature where there are cold bridges - especially apparent after retrofit.

12. Lack of attention to existing leaks and failures throughout process and the desire to cover up existing problems. Addition of non moisture open layers, including plastic paints. Addition of complex heating and domestic hot and cold water systems with no consideration of where water will go if a pipe is damaged. The covering up of all pipework behind layers that cannot be removed. Poorly executed or inappropriate insulation.
13. Lack of proper surveys, introducing systemic cold bridging, poor material selection not considering hygrothermal performance of the original structure
14. Loft conversions (blocking off eaves), using moisture vapour diffusion closed insulation on solid stone walls, installing mineral wool into brick and block cavities
15. Materials degrade, become porous over time, things that were designed in to allow air movement have become blocked, covered up, or sealed, (fireplaces, Int floor vents, wall vents, weep holes) Stock is not maintained, often a moisture problem can be ignored, go un noticed for months and when fixed, it is fixed locally to the source, by then moisture has affected much more of the surrounding area and the rot continues. The source, reason for the failure rarely explored, people go straight to "the cure"
16. Not carrying out proper repairs (to gutters, roofs etc) before carrying out retrofit works - so primarily related to quality of surveys conducted prior to retrofit, and lack of understanding and resources provided to address these issues.
17. Poor design, lack of access to appropriate materials and skills, lack of knowledge re traditional buildings, poor specification, lack of detailing, timescales for work, cost constraints, grant programme timings, EPC driven decisions, short term fixes and no long term assessment of solutions,
18. Poor detailing. Lack of adequate ventilation provision. Existing building defects that aren't adequately addressed - repointing, rainwater goods in poor condition / not meeting; inadequate drainage provision; ground level above the level of internal floors. Poor workmanship.
19. Poor or cheap building materials
20. Poor quality control, poor design, poor understanding of user influencing factors
21. Poor understanding of how older buildings were constructed and the type and behaviour of the materials that were used in them. There is an assumption that older buildings are inherently damp, which they are not. The problems arise when the natural vapour permeable nature of the structure is disrupted by poor design and detailing, very poor construction standards and the lack of ventilation provision due to the need to make houses as air tight as possible.
22. Poorly specified insulation installed badly in locations where there were already moisture issues that haven't been addressed.
23. Problems with incorrect installation of cavity wall insulation
24. Product or package based approach with no consideration for whole building. e.g. window replacement.
25. Providing insulation to inside of solid non-insulated external walls which changes the dynamics of the wall, i.e. making it colder and increasing the risks of surface and interstitial condensation in the wall and also reducing its ability to use the heat from the room to keep it dried out. Likewise, increasing insulation to a cold roof void without checking the need for extra cross ventilation to compensate for the reduced air temperature of the roof void leading to a higher risk of surface condensation on underlays and exposed structural members.
26. Rain penetration (CWI) and trapped moisture (EWI and IWI).

27. Reduction in natural ventilation IWI leading to inability of walls to dry through (a) lack of moisture escape tot eh inside and (b) lower temperature of walls so rain driven moisture is harder to evaporate off.
28. Replacement glazing more effectively sealing the building particularly where trickle vents were not installed
29. The replacement of windows with new sealed units, especially if the windows do not possess bespoke window vents or wall ventilators.

Don't know / no experience 3

B16. In your experience, is there a particular age or type of property that, following renovation/ retrofit, is more likely to be more vulnerable moisture problems? Please explain why.

1. Answer depends on many factors as even an older property with damp walls and draughts can be made to feel comfortable but it may take a lot of heating in the winter time to achieve this. For example I grew up in a four hundred year old thatched house with a Rayburn (type of Aga) which was lit all day and with open log fires in other rooms and walls with rising damp but it felt cosy. People generally will not run heating all day so as to save costs so older poorly insulated homes are at the greatest risk of moisture problems.
2. 1940 - 1960
3. In my experience, solid wall properties suffer very easily but partly because fuel poverty has a disproportionate impact. Flats in high and mid rise (partly due to nature of ventilation, but also because ducts etc have become blocked over the years).
4. All types
5. Our claims span all era's of housing stock. Modern construction has better ventilation, trickle vents on windows, extraction fans in bathrooms & kitchens, etc which day by day appear to better manage moisture levels to a happy equilibrium. This would lead me to consider that older housing stock may suffer more with moisture problems where ventilation is not designed into the structure.
6. General observation would be flats. always seem to lack ventilation
7. I would say it exists in all. Old buildings suffer from moisture problem as well as new built (especially the air tight ones)
8. No - it is linked to all properties as it is influenced by the use of the building by the occupants
9. No. it is more to do with how people live in their houses. There is a very high percentage that do not ventilate their homes in any way because they think that to do so will waste heat and the cost of producing it. This extends to disconnecting extractor fans, blocking air bricks, preventing cross flow ventilation in roof spaces, closing up chimney flues and many more examples.
10. Pre-1919 because of construction defects and leaks. 1960s-1970s system built because of poor insulation and thermal bridging
11. No
12. Older properties tended to have natural air flow through them due to their construction whereas latter day properties have insulation elements added as standard. The addition

of these elements to older properties has also served to encourage problems that previously didn't exist.

13. Not really. The problems are caused by numerous variables. While some concrete houses from the 60s may be prone to condensation issues by virtue of good air tightness and poor u-value, that problem may only be apparent if the occupancy is high. All buildings have their weak areas. These can be made problematic by under ventilation, under heating , over occupancy , lack of maintenance , lack of occupant understanding , particular microclimate , poor quality of original construction.
14. No. I've seen problems in all ages of houses - and of the three ones with serious issues mentioned above, one was 1890s, one 1920s and one 1970s.
15. Moisture problems will be present in all buildings, but their causes may be different. It is perhaps more prevalent in older buildings, where it is likely going to be due to condensation from poorly insulated windows, moisture ingress through solid walls, interstitial condensation in internal solid walls. Older housing may not have adequate foundations, and can experience moisture from the ground. More modern housing, it may be due to greater airtightness and insufficient removal of water vapour
16. Poorly insulated / unable to afford to heat ones; poorly ventilated; poorly maintained; Unprotected (those without sufficient external cladding approaches to reduce the effect of driving rain. This can be the case across a large variety of ages.
17. Certain types of dampness are more likely to affect houses of certain eras. Solid-walled properties typically built >100 years ago are more likely to suffer from structural forms of dampness such as rising damp or penetrating damp. They were commonly built without a DPC. Porous lime mortars and under-fired bricks were often used etc... In more modern housing stock, condensation tends to be the dominant form of dampness.
18. poorly insulated homes ie pre-2000 are prone, although super-insulated (new) homes can be problematic if the performance gap causes defects and other factors present.
19. I believe that properties prior to 1960 are more susceptible to moisture risk due to the layout lack of proper heating, and ventilation systems
20. I would say the issues are more pronounced in houses built in the last quarter of the 20th century, and in particular older buildings which have been inappropriately upgraded without due care for ventilation, thermal compatibility and continuity etc
21. I would think 1970s would be the worse, followed by system-built homes of 1940s and 1950s, then the older solid walled houses.
22. Generalisation the older the worse but there are lots of exceptions.
23. No, I don't think so I believe it is all dependant on location amount of occupants condition of the building and how people live in the current generation.
24. In general yes, pre-19th Century but non exclusively. Interventions carried out to any building can create "serious" moisture problems.
25. 1960s - 1980s seem worst for internally generated moisture loads, traditional buildings badly maintained are worst for moisture ingress from outside and occasional rising damp (due to incorrect ground levels and saturation due to faulty rainwater goods or abutting walls etc).

Don't know / no experience 4

B17. In your experience, which elements of deep retrofit projects are likely to create the highest risk of moisture problems? Please explain why.

1. Air tightening will cause chronic issues of elevated indoor moisture levels. Insulation may facilitate moisture ingress or interstitial moisture
2. All elements (walls floor and roofs) have their challenges and solutions. The myriad of interfaces between the elements is the hardest issue to resolve. This takes time and experience and costs money. The occupant needs to appreciate that the home may not need heating as hard as before and that there may be a mechanical system regulating the ventilation. They need to understand that if the ventilation system fails or is switched off that may adversely affect the air quality and humidity levels inside. They should also be aware that if they see a damp patch it may be more important to get it fixed than in a non retrofit.
3. Detailing around other building elements - creates cold bridges and gaps through which moisture can penetrate. On the better projects these are dealt with well. Problems more likely to occur on projects that are rushed to take advantage of government funding and not overseen by eco architect or specialist deep retrofit company.
4. Embedded timbers (from suspended ground floor joists to upper floor and ceiling joists, wallplates and window lintels) in exposed solid masonry facing south-west. Interstitial condensation between original windows and secondary glazing above the plane of neutral pressure at the tops of houses on the leeward side of prevailing wind. Roof timbers above areas of leakage (e.g. around loft hatches) into cold loft spaces. In parts of the building where leakage from poorly maintained rainwater goods haven't been prepared.
5. External wall insulation as it reduces ventilation and creates cold bridges.
6. It depends on how well or badly the work has been designed and then carried out. All ages of building are susceptible.
7. Inadequate ventilation - for deep retrofit it must be continuous, have excess capacity and be demand-controlled. Excessive insulation of vapour permeable solid walls inhibiting moisture movement/balance IWI - because of difficulty of achieving moisture balance or air-tightness, and the need for adequate ventilation
8. Insulating floors. Poorly understood and risks for unintentionally changing moisture dynamics.
9. insulation causes cold spots internally
10. Internal insulation of solid walls making the walls colder, slower to dry out and risk of any water penetration building up and becoming harmful. Risk of surface condensation on the inner surface of the solid wall between the insulation and wall where no VCL, or only partial VCL, is provided on the warm side of the insulation and difficulty in continuing the VCL around openings and junctions with intermediate floors.
11. IWI, much research now being done on the need to look at the outside and the inside for treatment. Even then, is a breathable system or a vapour closed system employed?. How do you maintain a true VCL?, what happens with radiator pipes, sockets, hanging shelves. How far into the room do you stop it if EWI s used on the back to be safe. What about the intermediate floor, what about the fact the wall is now cold and wet and will remain so because most of the heat that went through the wall has now been stopped?, does the external wall degrade faster?. I also worry room in room is not ell know by many and yet is being opened up under ECO.
12. Junctions between thermal elements. These are hard to treat, they span different retrofit trades (ergo contracts), each building is different, so standardisation of robust details is hard to achieve. Roof structures are complex, and many buildings have subsequent additions of many different periods (hence varying thermal performance).

13. Obsession with energy saving rather than whole house thinking, reliance on chemical fixes, membrane use
14. Our limited experience in this issue is where we have seen latter day solutions implemented on older period properties.
15. Partial works. e.g insulating some walls and not others, improving airtightness of one wall but not others, etc.
16. Poor design and understanding of moisture migration, poor quality control
17. Poor detailing could lead to issues of surface condensation and mould growth if not adequately considered. If a dwelling's air tightness is significantly improved, ventilation provision is even more important to get right.
18. poor detailing with the introduction of cold bridging, over optimisation of thermal targets and moisture trapped behind the new insulation due to poor surveys identifying defects
19. Solid floors. We have experienced this in the past. The best solution, digging up the floor and installing insulation is costly and disruptive. The secondary inferior solution of installing thin insulating materials and/or carpeting can result in different floor levels (a tripping hazard) as well as look aesthetically unpleasing. This secondary remedy may only be partially effective, and the carpeting may act to promote the proliferation of house dust mites
20. Solid walls, for reasons outlined in previous answer. Suspended floor joists as they are complex and require great care of joist ends, ensuring adequate ventilation is retained, compatible insulation is used, etc. Flat roofs especially where a warm deck is not possible and a deep understanding of building physics is required.
21. Use of materials such as PIR on solid stone walls
22. Walls, windows, junctions
23. Windows as they have lowest internal surface temperatures. That was not a good question

Don't know / no experience 4

B18. In your experience, following the completion of a retrofit project are there any particular lifestyle or maintenance requirements that you consider will be needed in addition to those expected for non-retrofitted buildings?

1. All energy saving measures bring a need to change lifestyle. Boiler and effective heating systems should be balanced, with TVRs set for optimum settings and these should be registered (never happens), control of the thermostat takes getting used to as people perceive it costs a lot more than intermittent on off heating. Loft requires eaves remain clear, Cavity requires good roof, gutter and pointing maintained and solid wall requires control of impact, raising of paths and fixing things into it. All retrofits should come with a section for the home owner, how to use, do, do not, then there should be a section for any contractors who come in to do any work that would interface with the retrofit undertaken with a list of do, do not etc.
2. Ensure adequate ventilation during moisture-generating activities - e.g. mandatory extract to outdoor environment
3. Ensuring the condition of any solid internally insulated external walls is kept in good repair to reduce or prevent rainwater penetration which could persist within the wall for longer due to the lack of heat from inside the building reaching the wall through the insulation. Maintenance and correct operation of any heating or ventilation system

provided as part of the retrofit to keep internal humidity and temperature at acceptable levels.

4. Focus on occupant induction because like 99% of the population they will be used to operating a building in a traditional way. Follow up is likely to be needed. Would be wise to fit a Switchee or similar device instead of a traditional thermostat, as this type of device can send alerts when temp and RH go outside certain parameters. You can add a CO2 sensor to the system, it will feed to the Switchee which will then transmit CO2 data. So extra expense for the Switchee hub, CO2 sensor and data charges, but much more risk managed and gives you an understanding of what may need to be improved when reiterating the design, ie provides a learning loop for the next project.
5. Good training / instruction of those who are to occupy the building so they fully understand what has happened to it and how they need to operate it.
6. Ideally, monitoring of moisture in hidden areas - especially wooden elements such as joist ends which can be susceptible to rot. Such monitoring is becoming lower cost due to "internet of things."
7. Knowledge that as the house has far less uncontrolled air leakage (i.e. is airtight) the ventilation system needs to be functioning correctly, maintained (or filters changed) and serviced. That maintenance of roofs, rainwater goods, window sills, brickwork etc, is even more important to prevent the build up of moisture in spaces that can't be seen such as between brick and internal wall insulation interface.
8. Looking after ventilation systems
9. Mainly around occupant interaction with ventilation systems - even just opening a window - as retrofit reduces natural ventilation.
10. No
11. None in addition - maintenance and ventilation etc are essential whether a dwelling is, or is not retrofitted.
12. Not in addition to - with possible exception of possibly taking care to maintain vapour control layer on IWI, roof/loft and floor insulation (though this also true of a lot of new build, and VCL should be designed to take people's habits into account and so is robust).
13. People need to be re-acquainted with their building and made to understand how new or adjusted behaviours are advisable. Leaky buildings and buildings with low levels of moisture generation are forgiving! *A bit like climate change people expect they can judge the future from what happened in the past but a higher level of airtightness with higher levels of moisture generation may have the same address but is effectively a different building.*
14. Seals, junctions, anywhere where moisture can get into the structure in the longer term. Issues to do with temperature and humidity within the buildings and the adaptations required in the services /ventilation strategy
15. The ability to effectively clean down external finishes from mould growth and lichen
16. There should be only improvements to lifestyle, people must be able to live in their homes how they see fit. There are likely to be increased maintenance requirements as it seems mechanical fans and associated filters are valuable enough in moisture, energy/cost, and air quality terms. Can this be balanced by reduction in heating maintenance requirements?
17. This is a real problem. How do you get a householder to open the windows and heat the home, when the resulting dampness problem is at a remove, intangible? By nature, human beings on the whole tend to respond to authority. They are more likely to act upon an authoritative, simple-to-watch, 3-minute video explaining why it is so important to do this, rather than heed the advice of a landlord or make the additional effort of

reading a leaflet. Is this something UKCMB could promote? To make such a video and ensure that all window fitters supply customers with one?

18. Use and maintain the ventilation system Don't dry laundry indoors Cook with lids on pans Don't under-heat
19. USER manual for vent/heating systems a MUST. Maintenance of systems critical.
20. Users need to understand role of ventilation and user lifestyle impacts.
21. We would expect the retrofit to be fully understood in line with the property it has been installed in. Understanding this can then be aligned to its ongoing use.
22. Yes, especially in residential buildings

Don't know / don't understand the question 4

B19. What do you think are most serious consequences of moisture problems for the UK ... ?

1. A combination of a lack of understanding by occupants and their activities plus improvements designed improve the situation that may not be fully understood as to their adequacy.
2. Damage and failure of building fabric. Damage to health of occupants.
3. Degradation of building fabric. Growth of mould. Health impact on vulnerable individuals.
4. Deterioration of internal air quality and of the building fabric as a whole.
5. Early building failure and increased risk of respiratory illness
6. Failure of UK buildings earlier than needed. Effects to health for occupants, a tacit acceptance that you can do nothing about it. A lack of confidence in solutions when clearly a high percentage mistreat/misdiagnose damp now and will do in the future unless some regulation / training is made mandatory.
7. Health and wellbeing, IAQ, structural issues.
8. Health expenditure Quality of life needlessly impaired. Potential cost of remedial work over next 30 years, diverting resources and capacity from the enormous task of bringing the nation's homes up to a good standard of comfort and energy efficiency.
9. Health implications at scale due to air quality. Building longevity.
10. Health implications for occupants & damage to buildings .
11. Health issues for occupants.
12. Health issues for residents - particularly elderly, young and those with pre-existing conditions..
13. Health issues for the occupants and the fabric of the building.
14. Health of occupants.
15. I would say health issue related to mould development.
16. Ill health of occupants, faulty building fabric, fear of energy efficiency measures .
17. Ill health of the occupants, both mental and physical health. Inability to sell their home. Inability to arrange mortgages. Inability to purchase insurance at a reasonable price (albeit FloodRe is working to address this).
18. Impact on health - we have the highest rate of asthma in the western world,
19. Impact on health of the occupants

20. Mould and health of the building
21. Mould causing ill health and decay of building fabric
22. "New generation" of moisture problems caused by rush to retrofit without thinking it through, and changes in new build construction (e.g. airtight buildings). At the same time, there is a culture of not bothering to maintain existing housing stock and waiting until issues become critical before dealing with them.
23. Occupant Health & Structural Failure potentially.
24. Poor health .
25. Poorer health for the most vulnerable, distrust of your amazing building stock. Large waste of money and environmental resources.
26. Rot in houses, structural failure and poorer health associated with breathing issues.
27. Serious, high-profile failures undermining confidence of government and the consumer in the industry, with consequential failure to retrofit the building stock.
28. Structural damage, health problems
29. Structural failure & respiratory disease
30. The literature reports a slowing down in improvement.
31. The most serious problems across all building types relate to deteriorating indoor air quality and its affects on human health. For historic buildings specifically, fabric decay leading to the loss of heritage assets is also a serious risk.
32. Unpleasant living conditions eg. spoiled decorations and effect on health.

B20. What regulatory, demographic, construction practice or lifestyle changes are having the greatest impact (whether beneficial or negative) for moisture in buildings ... ?

1. -ve Lack of building maintenance. Poor wording and implementation of Part F +ve Holistic building standards putting emphasis on improving whole building fabric and achieving ventilation, e.g. Passivhaus. That there is Part F at all.
2. A severe lack of joined-up thinking (build tight vent right). A move to modular can also present risks due to a lack of systems which are more forgiving to unforeseen moisture penetration.
3. Air tightness of buildings are reducing air quality and increasing dampness and therefore detriment to health, even if it is a slow progress.
4. Better quality control in construction, allowing for buildings to dry out naturally during the construction phase.
5. Careless construction practice appears to be having a negative effect
6. Cavity wall insulation driven by EPC requirements may have a negative effect but unclear
7. Cost of carrying our repairs and maintenance is too high for most people - due to a number of issues such as - VAT is chargeable on building repairs * - Building repairs tend to be labour intensive and difficult to automate due to variability of the housing stock - Certain regulations - e.g. working at heights - makes minor maintenance such as gutter clearance prohibitively expensive for many - Lack of skilled tradespeople able to carry out this type of work (apprenticeship and training schemes tend to focus on new build)

8. Crikey. For retail clients, they should be able to trust that they have procured a building where the work is sound, well designed and risk managed - I think this is a regulatory issue, unlike corporate clienting (build to rent sector to some extent but mainly social landlords, Local Authorities) where clients just need to undertake the long, hard slog of cultural change. They don't need the govt to mandate them to do it, or be given money, they need to be much more effectively challenged by their own regulator in terms of outcomes and value for money. They are spending the money at the moment on poor quality outcomes, so this needs to be diverted into clienting practice. Dealing with this by regulation/grant will not embed client change.
9. Demands for more domestic hot and cold water services and the desire that these are hidden. The increase in all manner of extensions that have intrinsically challenging interfaces while being built by those with the lowest standards. Variable occupancy (from overcrowding to more temporary occupancy in holiday homes for instance)
10. Demographic and lifestyle - denser occupation driven by economics and benefits cuts - exacerbating problems.
11. ECO schemes where cost per unit of carbon is everything. Situation where we will acknowledge that up to a third may have terrible moisture issues identified in their survey but if having any other measure than insulation, nothing will be done about it. Government needs to get out of its silo mentality, where each dept. has a budget and look at policy effects across the piece. Providing decent retrofit, including robust moisture management strategy alongside energy efficiency will not only help the environment dept't meet its goals, it will reduce health service costs, improve tax revenue and create jobs, but any "funding" is seen as a cost and it all comes from the one area.
12. Energy efficiency programmes
13. FloodRe is helping consumers obtain insurance at a reasonable cost in known flood risk areas. Planning and building control are trying to improve flood resilience in modern construction design. I have just finished a new build on the Thames where the property has had to be elevated in its build to rise above flood waters and have utility connections that can with-stand flood conditions.
14. Government sponsoring of cavity wall insulation for inappropriate Better insulated homes. Poor management of ventilation - trickle vents as the way to provide air. Low understanding among the public of the problem
15. Greater education, and more pride of home
16. Ignorance by occupants
17. Inadequate regulations, poor standards, self-certification, incompetent retrofit industry, house-builders who don't care.
18. Increasing thermal requirements can reduce moisture issues if designed and installed correctly but there should be a warning about using internal insulation as it can increase the risk of interstitial condensation. Greater air tightness is improving thermal comfort but this should be linked to the provision of a suitable ventilation system.
19. Lack of insulation requirements and practices
20. Negative, lack of joined up thinking and regulations inc. testing of materials. Beneficial, people slowly starting to understand breathability and the need for whole house esp with PAS 2035 and the potential knock-on effects of this
21. People are less likely to leave windows open when not in. More people work than ever before so properties don't have people coming & going and again locked up.
22. Procurement often forces work to be carried out at the wrong time of year - so forcing construction during wet weather and increasing construction moisture.

23. There seem to be a host of approaches by installers, new build developers, surveyors and construction companies alike but it is my opinion i am not sure if there is uniformity through all sectors and demographics.
24. this seems to want the answer to be "energy efficiency" but I believe energy efficiency is very important to user comfort and user prosperity so UKCMB should highlight the ways in which moisture control and energy efficiency can work together for positive benefit.
25. Ventilation, avoid drying clothes indoors (or have dry rooms with extract fans)

Don't know / covered elsewhere 6

B21. Do you have any views on what should be done, especially for future policy and regulation changes ...?

1. Accept that fresh air change in a building is needed so as to create a healthy internal environment.
2. An alignment of the building regulations to be updated as a whole rather than piecemeal
3. Any further increases in thermal insulation values should take into consideration the risk of overheating. Perhaps a method should be investigated for estimating the balancing point between providing enough insulation to gain maximum thermal efficiency before having to provide a cooling system. Ventilation levels should be assessed on the basis of what is needed to provide a healthy environment for air quality in preference to reducing ventilation to save energy. This could help illustrate the need for higher ventilation rates for impervious structures and a lower ventilation rate for breathable structures which allow some of the water vapour to disperse through the structure. This could also establish whether certain types of structure would require continuous ventilation or whether intermittent ventilation systems would be sufficient.
4. Automated ventilation based on indoor moisture/co2/etc, or coupled to the use of an appliance
5. Better prediction methodologies to be properly scrutinised in regulation. In a world of scarce resources, arguably regulation should require moisture protection of building elements before and during construction.
6. Better surveys and understanding of existing condition, with patterns of occupation also taken into account.
7. Bring detailing and ventilation provision to the fore; make sure that existing defects are addressed prior to undertaking any works; ensure that quality of workmanship is improved.
8. Building regulations for retrofit need to follow on from the good work done for the new PAS 2035. The government needs to stop funding poor piecemeal retrofit and instead let the owner of the property decide what it is best to do. More training is required in the industry for contractors, developers, building owners to understand the health implications of moisture in buildings, and their responsibilities under the health and safety act for homes.
9. Buildings could be inspected on a regular basis and basic repairs and maintenance carried out (e.g. gutter clearing, replacement of perished window seals, crack repairs etc...) much in the same way that one would expect to have to service a car on a regular basis. Certain elements of part C of the Building Regulations could be applied to existing buildings as a level of performance to aspire to - e..g. protecting moisture-vulnerable building elements from moisture from the ground, rain penetration, condensation etc...

10. Designers and builders need to consider how insulation, ventilation and moisture work together. They need to design in capacity. The design of water services within buildings needs to be regulated with mitigation strategies for when things fail. This is again about capacity. Constructions such as screed over insulation need to be regulated somehow with a BS for how they should be designed to avoid trapping moisture.
11. Everything is done in isolation, it needs a whole property solution that is adaptable depending on the build type, construction method, existing adaptations and proposed.
12. Greater emphasis on the whole house approach, training for all - builders, architecture students, building control...
13. I have the feeling ventilation is not always the best, maybe efficient ventilation should be mandatory (if this is not yet in practice).
14. Moisture professionals to be included in the design and construction phase
15. No insulation without ventilation - must be adopted universally. PAS2035 to be implemented as widely as possible.
16. Operations and Maintenance manuals (O&M) for occupants on best practice to avoid moisture buildups
17. Our current housing shortage and housing demand is increasing construction in areas known to have historical flooding issues. *Near where I live an area between Horsham and Crawley, now known as "Craw-sham", has had a large number of new builds completed on an area of land that historically often flooded. This suggests that planning has become to readily permitted, without consideration to the area's flood history.*
18. Reduce energy use by increasing insulation coupled with a requirement air tightness levels seen in other northern countries and for ventilation systems
19. Regulation to require effective moisture management is incorporate into the design and construction of new buildings and refurbes. Back up with better design of inspection of buildings as they are being built. Education of construction sector. Encourage better insulation through gov't programme- windows etc. Encourage the use of triple glazing and heat recovery systems in new build, eliminate trickle vents. Require better forced ventilation
20. Research further so future policy is based on facts & not assumptions
21. Rewrite all Building Regs to be coherent and special reference for solid walled buildings. Rewrite all testing regimes for materials to allow for specification of appropriate ones on older buildings
22. Site moisture must be accounted and controlled more. More joined-up thinking in terms of ventilation and airtightness. More priority to use materials with lower toxic emissions a la SENTINEL HAUS.
23. Tackle fuel and health policy by dealing with the poorest in societies buildings, not just underfunded insulation and boiler measures. Regulations on moisture should have a direct link to part L and part F as all three stand and fall together. Stop schemes that start in the winter and have to be finished in April as this is THE worst time to be carrying out the work, or, make sheeting mandatory to protect the building when working in winter conditions
24. The target U values for solid stone walls should be increased up to 0.45-0.50.
25. Tougher regulations, tougher standards, better training, abolish self-certification, nationalise land.
26. We should treat the problem proportionally, and ensure that it complements the other required changes to our society and housing stock needed to respond to the challenges of climate change. The smaller home renovation and cyclic maintenance interventions must be captured, not just projects with professional design teams. Obligations on

products and suppliers to ensure they are assisting construction achieve the requirements.

27. Whilst there is sufficient regulatory policies in place, is there enough understanding of the impacts of non conformance and post installation checks?
28. Yes. The retro-fit industry must be effectively policed.

Don't know 2