

HEALTHY OCCUPANTS

CRAMPED SPACES. INDOOR PLANTS. MOULDY BATHROOMS.
WHAT AFFECTS OUR HEALTH AT HOME AND IN THE OFFICE?



Healthy Occupants

by Jodie Walker

Buildings should serve not just the "physical need of accommodation but also the social, psychological and physiological needs of the occupants".

Health is important. That in itself is obvious. What is not so obvious is the various factors in our homes and workplaces that can impact our health. Considering most of us spend the majority of our time within a building, whether it be home or office, it can be helpful to be aware of these factors.

In this report Secret Agent will summarise some of the common issues within buildings that influence the health of its occupants. We have previously discussed things like light and noise in our reports on health. This report will consider issues other than these including cramped spaces, greenery, water damage and emissions from building materials.

Cramped spaces

Apartment living is becoming increasingly common in our big cities. No longer just an option for university students or single corporates, urbanisation and population growth have meant that people of all ages are choosing to live in apartments. This includes couples, families and even older generations who are looking to downsize.

Whilst apartment supply is continuing to keep up with the demand, the design of some apartments is not ideal for health. A lot of this is due to the size and layout of the apartments, meaning that they are cramped and dark. This might not seem like a big issue, and over the course of a year or two it probably won't be. Long term though, a cramped environment can increase stress levels and put a strain on everyday life. If you have ever experienced living in a small space, even if it is just in a hotel room for a few days, you will understand the strain it can have on relationships as well as your own sanity.

To add to this, many employees spend their day in a cramped work space or cluttered office. Employees have little choice on how their workspace is designed, but they do have a choice in where they live. A home is supposed to be a haven where you can come back to and feel at ease. Escaping a cramped workspace only to arrive at a claustrophobic apartment is not going to make you feel good.

Crowded living conditions have been shown to have a relationship with poor mental health. For example, a study on women living in crowded homes showed that they have a higher likelihood of suffering from depression than those who don't. (Regoeczi, 2008)

An increased risk of heart disease and developmental delays in children are other health consequences linked to cramped living arrangements.
(Bashir, 2002)

Stress has been linked to low grade inflammation in the body which has associations with the development of many chronic disease including heart disease, cancer and autoimmunity as well as mental health disorders such as depression and anxiety. (Mariotti, 2015)

This highlights the importance of choosing an apartment with enough space where possible, especially if it is to be your permanent home for a significant period of time. If you can't afford a bigger apartment, then you can look for buildings that have other physical amenities that can be accessed in order to feel a sense of spaciousness, such as roof top entertainment facilities or common garden areas.

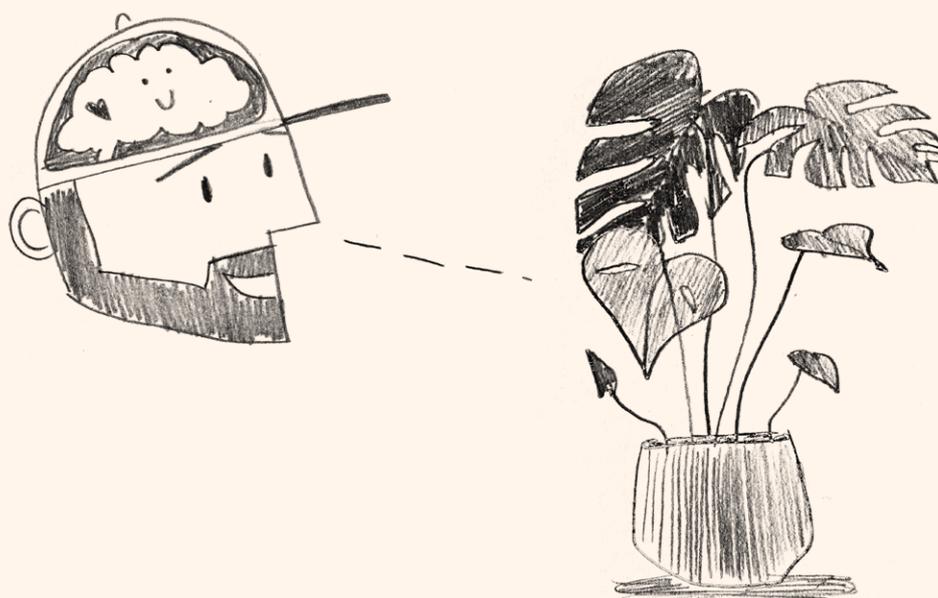
Greenery

Green space is as important as physical space when it comes to your health. The World Health Organisation (2019) has estimated that physical inactivity due to poor access to green space and limited walkability accounts for over 3% of global deaths. They also acknowledge that green space has an impact on your mental wellbeing.

Whilst it may be optimal to be able to see green space from your home, it seems that what is more important is the perception of how close you are to it. If you feel that you live within easy access of a green space (whether or not you can see it from your home), and this space is also usable, you are more likely to be satisfied with your neighbourhood. This is regardless of the actual size of the green space. Neighbourhood satisfaction has been linked to happiness and better mental health. (Zhang et al, 2017)

It makes intuitive sense that being able to see green space from the comfort of your home would impact your perception of how close and usable it is. It also makes sense that it would affect how we feel. A quick glance at a mark which looks like a spider on the wall can evoke fear in us, just like a quick glance at a plant may make us feel somewhat at ease, even if we don't fully realise it.

A study in Adelaide, Australia investigated the relationship between perceived greenness of a neighbourhood and the participants perception of their mental and physical health. (Sugiyama et al, 2007) Unlike most studies which tend to group mental and physical health together into general health, this one separated them to see what impact green



space had on each. It found that perceived greenness of a neighbourhood was strongly associated with mental health, but not so much physical health. Increased walkability explained the link between greener areas and physical health because green spaces encourage walkability. In other words, they found that the association between green space and physical health is not significant once walkability is accounted for.

When it comes to mental health, there does seem to be a direct relationship with greenness that is not attributed to increased walkability or even better social cohesion. They hypothesised that this could be due to the restorative effects of green space and natural environments on a person's mental health. These restorative effects may be achieved by physical contact with nature or by viewing nature from a distance (static contact). Since the benefits of walking in nature were already taken into account in their model, they suggested that static experiences of nature may play a role in the association between greenness and better mental health.

In our busy work lives we are often required to focus our attention on specific tasks. Screening out distractions to do this can result in attention fatigue.

It has been found that exposure to natural settings can help you recover from this attention fatigue and improve memory. (Berman and Kaplan, 2008)

In this way, nature has a restorative effect on the brain and can help improve productivity and cognitive health.

If you think about walking around a busy city and compare this to walking around a landscaped garden, there is a lot more you have to think about when walking through the city. There are usually lots of other people to navigate, cars to look out for when crossing roads and signs everywhere trying to grab our attention. Walking in a natural environment doesn't have this affect and can help release stress.

Plants in the office or home not only make a space visually appealing, they can also compensate for lack of a natural view. Studies have shown that greenery in the office can result in decreased sick days amongst employees, reduced anxiety and increased efficiency.

For example, a study which measured the biofeedback of office workers found that both views of nature through a window and views of indoor plants are beneficial for health and productivity.

They had six scenarios overall including windows with a view of the city, windows with a view of the city and indoor plants, windows with a view of nature, window with a view of nature and indoor plants, office with no window view and office with no window view but with indoor plants. There was less stress and tension measured with a view of nature or a view of indoor plants. Stress recovery was also faster when viewing nature than when viewing urban settings. (Chang et al, 2005)

It might be hard to relocate a home or office so that it is closer to nature or has a view of it. However making sure the internal living or working environment incorporates natural elements like plants can make a big difference and is easy to implement. Images of nature don't seem to have the same beneficial effect however. A study that looked at the role of artificial representations of nature on human health found that participant's heart rate recovered from stress more quickly when they had a glass window with a view of nature than when they had plasma screen showing a view of nature. (Kahn et al, 2008)

Water damage

Water damage can be a nightmare for property owners. Often tiny leaks aren't even evident until it is too late and the damage has been done. It is not only costly to fix but water trapped inside walls and flooring can cause dampness and mould to grow which both have health implications.

Dampness

Dampness can include the humidity of indoor air as well as moisture in the actual structure of the building. A large review of multiple studies found that dampness in buildings is associated with coughing, wheezing, and asthma. This is not only in the home but also in workplaces, schools and day care facilities. There have also been cases in which dampness was associated with tiredness, headaches and infections of the respiratory tract. (Bornehag et al, 2001)

It is unknown how dampness may result in these ill effects on health. There is no evidence that living or working in a damp building improves health so it makes sense to try to minimise dampness where possible. Being aware of the signs of leaks

or water damage can help you identify dampness and fix it. These signs can include bubbling paint, dark patches on walls which are not scuff marks or dirt, and floor boards or tiles coming loose.

Proliferation of moulds

The appearance of mould is also a sign of dampness as it allows for an environment in which it can proliferate. Mould and its spores are everywhere and serve a useful purpose in breaking down plant and animal matter. Different species of moulds prefer different surfaces, so the mould in your bathroom won't be the same type as the slime in your garden. All moulds require three things to grow however. It needs the right temperature, humidity and time. The closer the relative humidity gets to 100%, the faster mould will grow. (Klintberg et al, 2008) When a property has water damage, the humidity in the walls or floors rises and may reach 100%. The home can provide many other perfect opportunities for mould to grow including condensation on windows, bathrooms with ineffective ventilation, potted plants, air filters, standing water in drains and air conditioners.

The best way to prevent mould growth is to identify and remove any sources of dampness and make sure there is adequate ventilation, not only in each room of a house, but also in the construction (the way the walls and floors are put together). This will help keep moisture under the levels that are required for mould to grow. There is also mould inhibiting paint which can be useful in dark rooms which may be hard to change structurally (for example some rooms in many terrace

houses are dark and prone to dampness). Dehumidifiers can be used in humid climates.

The presence of mould does not necessarily mean you would have inhaled the spores and it certainly doesn't mean you are going to get sick. Although mould has been correlated with human illness, it is difficult to identify whether it is the mould, other airborne matter or chemicals from the destruction of materials that the mould was present on.

There are numerous studies which have linked the presence of mould with allergies and respiratory issues such as asthma, sinus infections and coughing. (Fisk et al, 2010)

Some people are more sensitive than others, and those who have compromised immune systems may find themselves particularly susceptible to mould infections. (CDC, 2014)

There is no benefit to spending time in a damp or mouldy building and because it is also likely that the air quality or ventilation as well as light would be poor, it seems obvious that we should aim to prevent mould growth and thereby reduce the chance of any ill health consequences. Further, mould destroys whatever material it is growing on so it makes sense to try to remove it for the structural integrity of the building!

Emissions from building materials

It has been estimated that most of us spend about 90% of our time indoors (Dales et al, 2008). This may be at home, at work or in the car. In terms of pollution, the air quality of our homes and offices should be more of a concern than the pollution from cars and our external environment. This is especially the case in extreme climates where windows and doors are kept closed to maintain internal temperatures at a comfortable level.

Regardless of whether or not external pollutants can enter homes, there are various airborne chemicals and gasses which are released from common materials inside the home and can impact health.

For example, it is well established that gas heaters, if not serviced regularly, can lead to Carbon Monoxide leaks and ill health or even death.



Other sources of airborne chemicals are materials such as paint and carpet. New floor finishes, glues, paints, wood-based products and freshly dry cleaned clothing, can all release gases including Volatile Organic Compounds (VOCs) and formaldehyde which can be a health concern. Since they decay over time, they are more of a problem in brand new houses or those that have undergone a renovation. Formaldehyde is mainly emitted by wood based products such as plywood and particle board which has been assembled using a formaldehyde resin. It can cause irritation to our airways, eyes and throat at high enough concentrations, and this is worse in those who already have asthma or allergies. (Krzyzanowski et al, 1990)

If you've ever walked into a home that hasn't been occupied in some time you would probably have smelt a musty odour. This smell is due to VOCs which are released when mould (and bacteria) break down materials that they are surviving on in the home. Room deodorisers and freshly dry-cleaned clothes are other common sources of VOCs. In terms of ill-health, exposure to VOCs has been linked to increases in asthma symptoms and respiratory issues. For example, a study in Sweden found that exposure to VOCs emitted from indoor paint can cause inflammatory reactions in the airways. (Wieslander et al, 1997)

Whilst not related to health as such, an interesting study conducted in America is worth noting as it found negative implications for VOCs in the workplace in terms of productivity. The study used computer tools to test participants decision making skills in a traditional office environment (which had a high concentration of VOCs) and a green office environment (which had increased air ventilation and lower VOCs).

Cognitive performance was negatively affected in the traditional office environment and participants got better scores in the green office. (Allen et al, 2016)

The best way to reduce the concentration of VOCs and formaldehyde, other than not having the products that produce them, is to make sure there is proper ventilation. This can be either through opening windows or turning on air conditioning. This is especially the case if you have recently done any painting or purchased any new wood products.

Another way to improve air quality is to make sure you clean your house frequently and take the rubbish out daily! Both settled dust and stored food waste can be potential sources of air contaminants known as endotoxins. These come from the

membrane of particular types of bacteria. Elevated levels of endotoxins in house dust have been associated with increased risk of repeated wheezing, especially in children and those predisposed to allergies. (Park et al, 2001)

Carpets and soft furnishings can also contain endotoxins as well as dust mites if they are allowed to build up. Dust mites are a major trigger of allergic reactions in many people. These reactions can be as mild as a runny nose, or as severe as asthma attack. Humidity is the key for dust mite survival and they are found in higher concentrations in more humid environments. Most exposure happens when you are sleeping or if you disturb settled dust. Another interesting allergen, and problem in many inner city dwellings is the cockroach. A study of children with asthma found that those who were exposed to cockroach allergens in their bedrooms had more medical visits and days of wheezing than other children with asthma. Further, children who were exposed to high levels of cockroach allergen were 35 times more likely to have asthma than those who weren't. (Rosentreich et al, 1997)

Conclusion

Buildings should be seen as more than just a means of accommodation. They also serve a purpose in creating an environment that is safe in terms of an occupants physical and mental health.

Cramped spaces, lack of greenery, water damage and emissions from building materials are all factors which can have a negative influence on the physical and mental health of occupants within a home or office. These health consequences can be mitigated or even prevented and this starts by being aware of the issues. 💎

REFERENCES

- Barton and Rogerson, 2017. The importance of green space for mental health, *BJ Psych Int*, 14(4):79-81.
- Basir, 2002. Home Is Where the Harm Is: Inadequate Housing as a Public Health Crisis, *Am J Public Health*, 92(5).
- Berman et al, 2008, The cognitive benefits of interacting with nature, *Psychol Sci*, 19(12):1207-12.
- Chang, C.Y., and P.K. Chen. 2005. Human Response to Window Views and Indoor Plants in the Workplace. *Hortscience* 40, 5:1354-59.
- Fisk et al, 2010, Association of residential dampness and mold with respiratory tract infections and bronchitis: a meta-analysis, *Environmental Health*, 9(72).
- Kahn et al, 2008. A Plasma Display Window? - The Shifting Baseline Problem in a Technologically Mediated Natural World. *Journal of Environmental Psychology* 28(2):192-99.
- Krzyzanowski et al, 1990, Chronic respiratory effects of indoor formaldehyde exposure, *Environmental Research*, 52(2): 117-125.
- Rosentreich et al, 1997, The role of cockroach allergy and exposure to cockroach allergen in causing morbidity among inner-city children with asthma, *N Engl J Med*, 336(19):1356-63.
- Regoeczi, 2008, Crowding in Context: An Examination of the Differential Responses of Men and Women to High-Density Living Environments, *JHSB*.
- Sugiyama et al, 2007, Associations of neighbourhood greenness with physical and mental health: do walking, social coherence and local social interaction explain the relationships?, *J Epidemiol Community Health*.
- WHO, 2019, <https://www.who.int/sustainable-development/cities/health-risks/urban-green-space/en/>
- Wieslander et al, 1997, Asthma and the indoor environment: the significance of emission of formaldehyde and volatile organic compounds from newly painted indoor surfaces, *Int Arch Occup Environ Health*, 69:115-124.
- Zhang et al, 2017. Quality over quantity: contribution of urban green space to neighbourhood satisfaction, *Int J Environ Res Public Health*, 14(5): 535.

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