

The impact of the design of urban dwellings on health and wellbeing

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UK | CHINA | MALAYSIA

BDP.



‘placemaking for the modern world’

BDP.



humanising healthcare



humanising healthcare



healthy cities

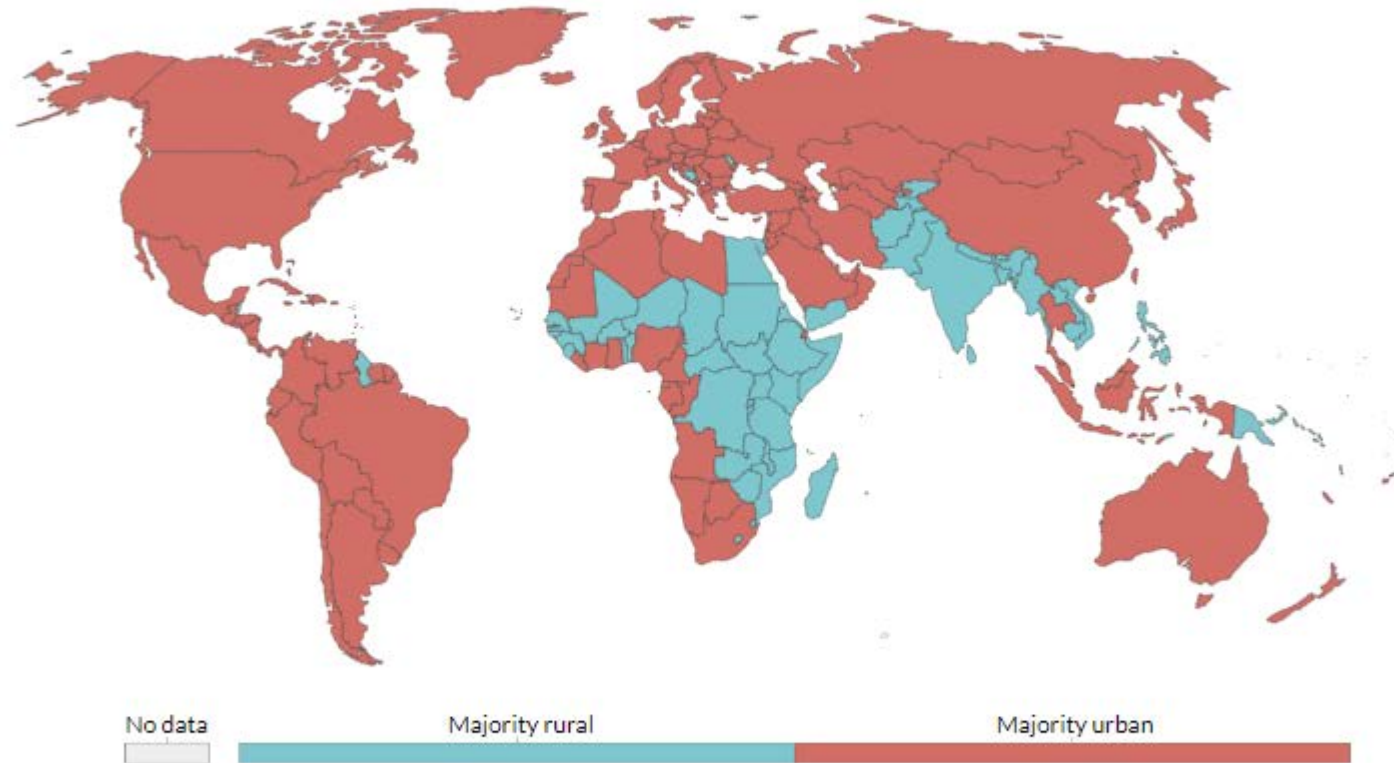


health, happiness and housing

Do more people live in urban or rural areas?, 2020

Share of the population which live in urban versus rural areas. Here, 'majority urban' indicates more than 50 percent of the population live in urban centres; 'majority rural' indicates less than 50 percent. Urban populations are defined based on the definition of urban areas by national statistical offices. This is based on estimates to 2016, combined with UN projections to 2050.

Our World
in Data



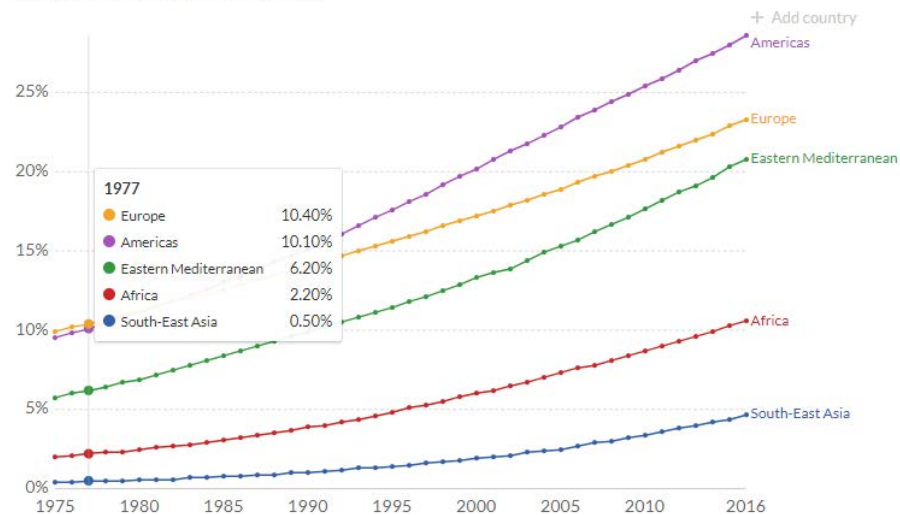
Source: OWID based on UN World Urbanization Prospects (2018) & Historical Sources (see Sources tab)

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Share of adults that are obese

Obesity is defined as having a body-mass index (BMI) equal to or greater than 30. BMI is a person's weight in kilograms divided by his or her height in metres squared.

Our World
in Data



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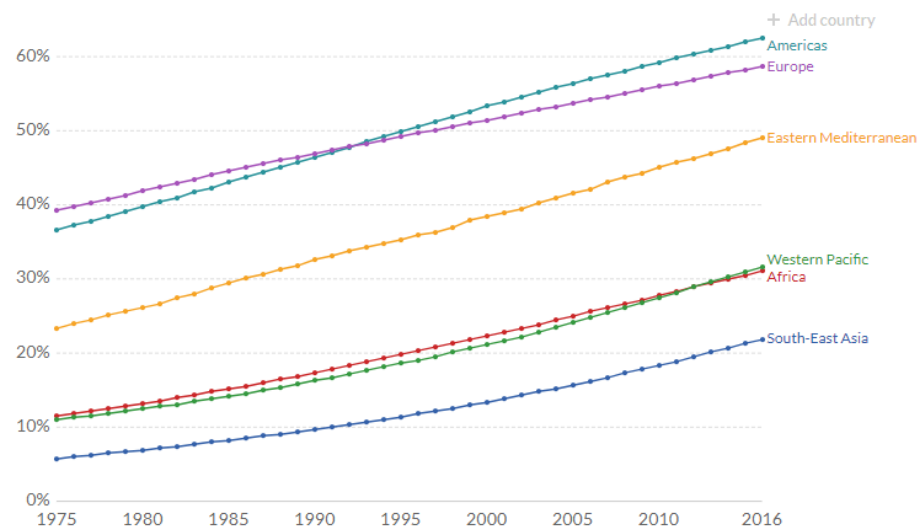
“In the last three decades, not one country has achieved success in reducing obesity rates and we expect obesity rates to rise steadily unless urgent steps are taken ”

Dr Christopher Murray, Director of the Institute for Health Metrics and Evaluation at the University of Washington

Share of adults that are overweight

Share of adults aged 18 years and older who have a body-mass index (BMI) greater than or equal to 25. BMI is a person's weight in kilograms divided by his or her height in metres squared.

Our World
in Data



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- Depression is a common mental disorder. Globally, more than 300 million people of all ages suffer from depression.
- Depression is the leading cause of disability worldwide, and is a major contributor to the overall global burden of disease.

World Health Organisation

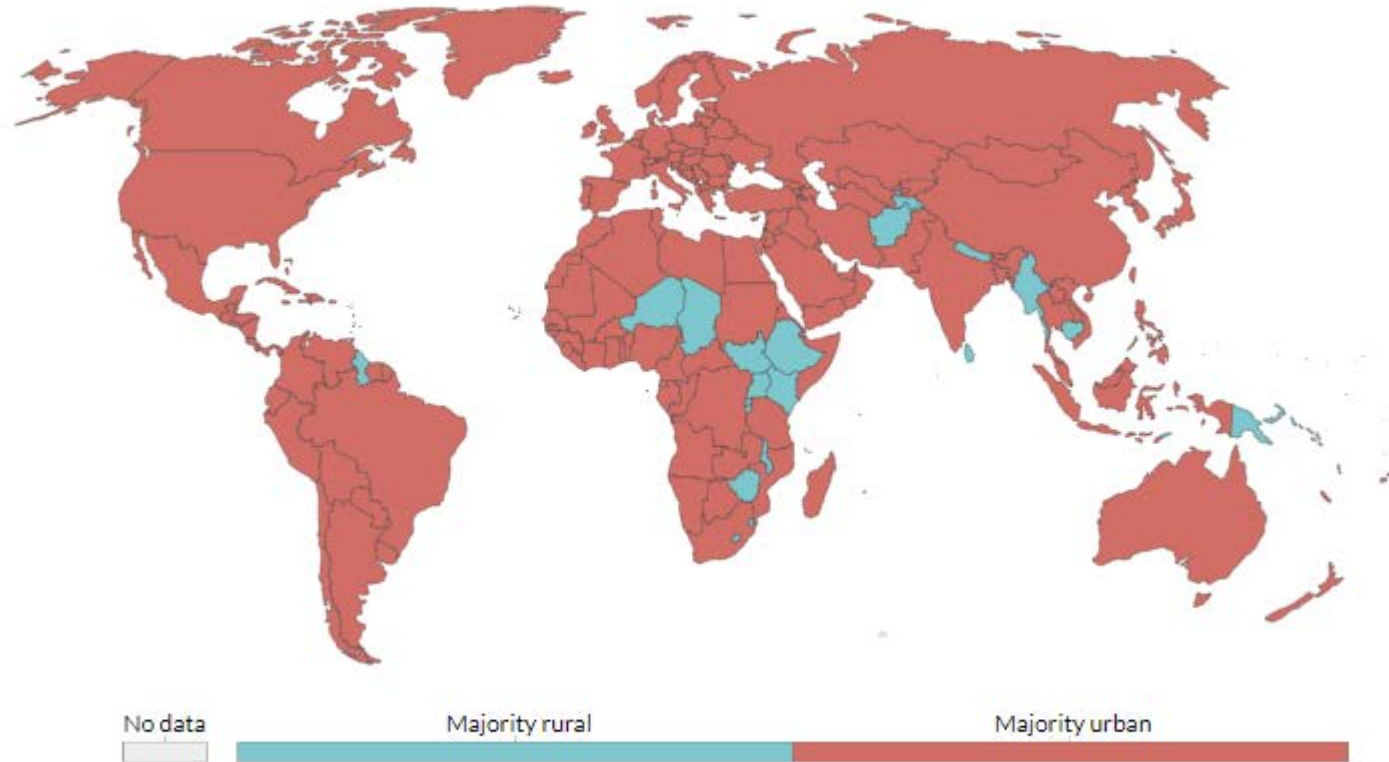
In 2014, **19.7% of people in the UK aged 16 and over** showed symptoms of anxiety or depression - a 1.5% increase from 2013. This percentage was higher among females (22.5%) than males (16.8%).³

Mental Health Foundation

Do more people live in urban or rural areas?, 2050

Share of the population which live in urban versus rural areas. Here, 'majority urban' indicates more than 50 percent of the population live in urban centres; 'majority rural' indicates less than 50 percent. Urban populations are defined based on the definition of urban areas by national statistical offices. This is based on estimates to 2016, combined with UN projections to 2050.

Our World
in Data

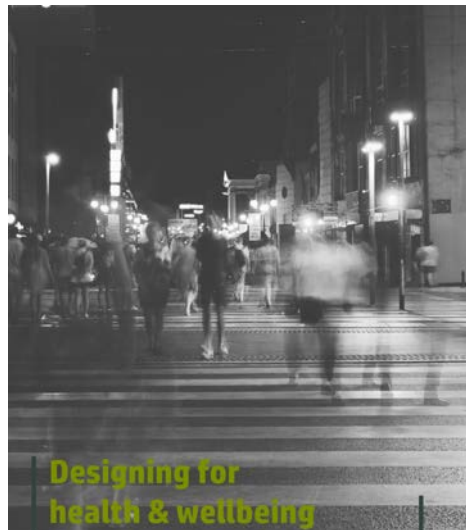


Source: OWID based on UN World Urbanization Prospects (2018) & Historical Sources (see Sources tab)

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Research Aims:

- 1) How does the built environment impact on our health and wellbeing?
- 2) Which design principles can we implement to remedy/reduce these impacts?
- 3) How do city centre apartments affect current residents health and wellbeing?
- 4) Where does designing for health and wellbeing meet the most resistance?



Designing for health & wellbeing in city centre apartments

Parisa Kanabar

AIR QUALITY

Poor air quality is 'responsible for a large global burden of mortality and morbidity' according to a study published in the Lancet.²⁸ The World Health Organisation recently found that more than 90% of the world's young people - 1.8 billion children - are breathing toxic air, storing up a public time bomb for the next generation.²⁹ The data showed that 600,000 children die every year from acute lower respiratory infections resulting from breathing dirty air. This is a particular cause for concern in the context of designing for city centre apartments. The problem is exacerbated by the high levels of traffic found in cities, as well as the tall form of the built environment which causes highly concentrated areas of pollution.³⁰



People often use external courtyards to smoke. To mitigate against the poor air quality and health problems caused to others by this, a dedicated area for smoking could be provided that is well ventilated and separate from the rest of the building. No resident should have to walk through this space to reach their flat if they do not wish to, and communal external spaces should be clearly labelled as non-smoking, particularly courtyards and entrances. If appropriate, make the whole building a non-smoking area.



Specify materials and products that promote good indoor air quality:

- Materials chosen should work with adhesives that are non-toxic, low-VOC, and water based. Choose coatings that emit little/no odour, are cleaned and maintained easily therefore reducing the need of the occupant to use harsh chemicals to clean, and are designed to protect from moisture damage therefore preventing the growth of mould.³¹
- Ensure that any work requiring the use of materials/coatings that emit strong fumes is carried out in a well-ventilated environment well before the apartment block is in use so that any pollutants are sufficiently dispersed by the time the occupant moves in.³²
- Where possible, avoid using carpet which has the potential to collect allergens. Instead specify materials such as tile, wood flooring or polished concrete.³³

²⁸ MIZOTA H., L. A. RODRIGUEZ A., VANDER HOOF, MERRIN C. (2012). Selected major risk factors and global and regional burden of disease. The Lancet, 1147-48.

²⁹ WHO, IN. (2018). 30% of world's children are breathing toxic air, WHO study finds. The Guardian.

³⁰ MCKENNA, P., SMITH, K. A., REEVES, S., TONNE, C. & SPENCER, T. (2007). Energy efficiency and the built environment. The Lancet, 1175-87.

³¹ GO, W. (2018). INDOOR AIR QUALITY.

³² UNITED STATES ENVIRONMENTAL PROTECTION AGENCY. Controlling Pollutants and Sources Indoor Air Quality Design Tools for Schools (Online).

³³ SANDERSON, J. (2012). The Sound Proof Syndrome: Your Health and the Built Environment. Chichester: Wiley Academy.

³⁴ GO, W. (2018). INDOOR AIR QUALITY.



ACCESS TO NATURE

A study undertaken by Deakin University found that contact with nature alleviated anxiety, depression and psychosomatic illnesses such as restlessness, insomnia, tension and indigestion.³⁵ Hospital patients with a view of nature require less pain-relieving medication and recover faster than those who have a view of brick walls. In dental surgeries where paintings of nature are displayed, patients are less stressed. Students perform better on tests when they are close to nature.³⁶ It is clear that nature is hugely beneficial to both our physical and mental health and it would be helpful to understand why.

Biophilia is the hypothesis that humans are genetically designed to affiliate with nature, based on our evolutionary history.³⁷ Plants played a significant role in the survival of our ancestors as a source of food and shelter, and as an indicator of water. Therefore, we can assume that plants were a significant aspect of the human Environment of Evolutionary Adaptation (EEA) and as such, have substantial bearing on the evolution of the brain. Living in environments that are markedly different from the way of life that we are adapted for is known as a mismatch, some of which can be positive such as sleeping on a bed instead of the floor.³⁸ Others are negative and are known as disorders. The whole body is affected by disorders, but the brain seems to suffer the most because the majority of brain development takes place after birth and is highly influenced by the surrounding environment. According to a paper from the International Journal of Environmental Research and Public Health, 'this vulnerability presumably explains why mental disorders are one of the main health problems of Western societies'.³⁹ Lack of plants in the built environment can signal to humans on a subconscious level that they are in an 'unnatural' and therefore possibly unsafe environment. A common example of this which most can relate to is the fear response triggered by a stick on the ground remotely resembling a snake - the response happens before we have even realised that the 'snake' is in fact a twig. Therefore, 'nature appears to have qualities useful for stress relief, mental restoration, and improved mood simply by being consciously or unconsciously "pleasing to the eye"'.⁴⁰

³⁵ HALL, J. C., TOWNSEND, M., BROWN, S. T., LEE, L. (2012). Healthy Parks, Healthy People: The Health Benefits of Contact with Nature in a Park Context. Research in Public Health and Behavioural Science, Deakin University.

³⁶ GO, W. (2018). INDOOR AIR QUALITY.

³⁷ HELLER, S. (2012). Biophilic People and Nature in the Modern World. Connecticut, New Haven Press.

³⁸ LARSEN, B. & HALL, S. G. (2018). Biophilic Design: Does Visual Contact with Nature Impact on Health and Well-Being? International Journal of Environmental Research and Public Health, 15, 1137-45.

³⁹ Hall, J.

⁴⁰ Hall, J.

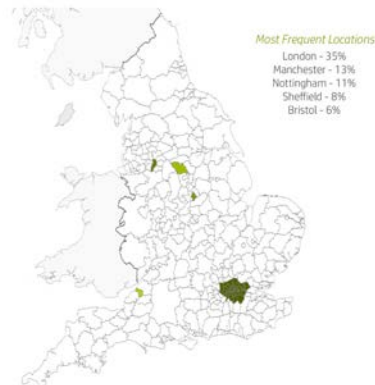
Research Methods:

- Literature review
- Survey (100 city centre apartment residents)
- Interview industry professionals and clients

WHO RESPONDED?

LOCATION

A link to the survey was shared with friends and family, on social media and to all BOP offices with a note to make people aware that they should only do the survey if they live in a city centre apartment. The results therefore give an idea of the type of demographic that might live in a city centre apartment.



All Locations:

London, Sheffield, Nottingham, Leicester, Welington, Shiple, Manchester, Guildford, Glasgow, Leeds, Cardiff, Portsmouth, Bristol, Islington, Reading, Stirling, Epsom, Newcastle, Birmingham, Newton Abbott, Teddington, Edinburgh

SLEEP

On average, how many hours of sleep do you have a night?



9 hours 8 hours 7 hours 6 hours <5 hours

The above questions were asked to gauge length and quality of sleep - someone might be sleeping eight hours a night but have poor sleep quality, sometimes without realising, and some might be able to function perfectly well on less than eight hours of sleep. Asking people if they wake up tired therefore provides a better picture of whether they are getting enough sleep of a quality that is suited to them.

Does light from outside your window have a negative impact on your sleep? E.g. from street lamps, advertising, cars



"It does but good black out blinds were provided so it was fine." "My room faces away from the street"
"There is a hotel sign a few floors below I live on the 14th floor and the light is bright"
"Used to the street lights outside, but always sleep better outside of the city"

Most common methods of reducing light pollution from comments:

- Location of bedroom relative to streets/other developments
- Black out blinds installed
- External lighting faces downwards

ARCHITECT INTERVIEW - A CONT.

"So some things are very obvious, others are a bit more subtle and I think perhaps people might be aware of it more subconsciously."

The subtlety of health and wellbeing design principles was mentioned again. Most buyers would recognise the benefits of a balcony when viewing a home, but they might only notice efforts to improve air quality or daylighting on a subconscious level.

"Sometimes the plots that are drawn within a masterplan maybe don't suit, people haven't thought about the depth of plan of the building and how the building might be configured"

"It's quite difficult if you have to take on that apartment scheme, to design out that adjacency."

"You have to try and be robust with your masterplans but it's not always possible to foresee every eventuality."

When designing masterplans that enable designers to take them forward and create healthy buildings, it became clear that orientation and adjacency are key. It's important for the masterplanner to consider the uses of the buildings next to planned apartments and whether they are suitable, whether they might be a cause of environmental stressors, or whether they might contribute to a social, safe environment. An example was also mentioned where an apartment footprint was drawn at masterplanning level which didn't work when it came to designing the apartment at detailed level after surveys revealed previously unknown site constraints

"There's a difference between what agents might say based on their experience of the existing conditions of the market and the reality of the younger generations who are the next set of occupiers, buyers and tenants, who have a different view on the world."

It was felt that often the architect's views are overridden by those of the agent consulting the client, leading to less health and wellbeing principles implemented into a design. The architect commented however, that models of what will sell are from five or ten years ago due to the slow changing nature of the housing market. Radical innovators are needed to introduce change and when they do, it's five years for the idea to become a reality and another five for it to become accepted as a new housing model.

DEVELOPER INTERVIEW

Who? Director of small development company that tends to work on housing projects ranging from 4 to 15 units. The developer is currently acting as consultant on a city centre apartment scheme with 97 units.

"I could not say that I have ever heard anyone talk about health and wellbeing at a young age."

"That might be because the industry is so immature in that respect that it's not something they think to ask about."

The developer noted that he had not heard anyone ask specifically about the health and wellbeing aspects of a home. An exception was in the older market where customers were concerned for their health and wellbeing as they aged. This tended to be principles of adaptability related to future-proofing - measures that were a reaction to existing poor health as opposed to measures covered in this report that could prevent poor health. The example the interviewee used was planning removable joists in circulation areas to allow for a lift to be inserted or designing bathrooms that could be easily altered or rearranged. It was noted however, that there is a chance that the housing market could be behind other sectors in terms of placing importance on health and wellbeing, to the extent that a buyer might not be aware that this was something to consider.

"Affordability, in my opinion is 90-95% of the reason [that the younger market considers when choosing a home]. The second reason would be the design"

The developer felt from experience that affordability was the most important factor that the younger market considered when buying a house. Design was the second most important factor, with the buyer considering 'curb-side' and 'front door' appeal.

"I think people [buyers] quite often picture the scene in their homes when they have friends round for drinks and parties, and probably don't rehearse in their head that they might just be watching Sky Sports on a Tuesday evening when it's raining outside."

The developer felt that how people aspire to live versus how they actually live are not always the same. Without a background in design, it is more difficult for a buyer to ascertain how they might use their home? Is there a question here of ensuring that buyers are more educated in what makes a healthy, happy home?

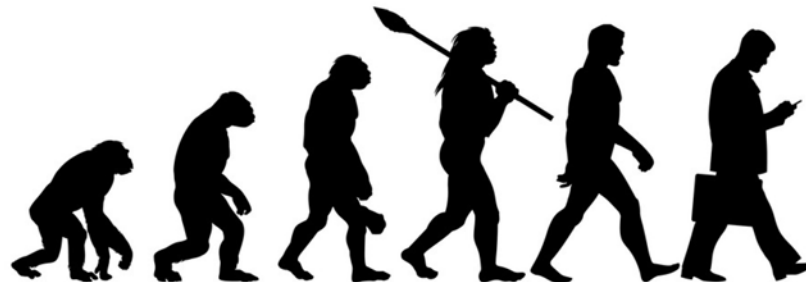
"[If] you're only taking half an hour to [STATION], door to door, the idea of not having a car, is perfectly acceptable and is a sustainable lifestyle."

The developer noted that where an apartment block was within a reasonable distance to public transport systems, parking for residents was not required. This highlights the significance of considering location of apartment blocks when designing a masterplan as it is not something that can be altered when working on the individual apartment block.

The evolutionary happiness function

(Gary Becker and Luis Rayo, University of Chicago):

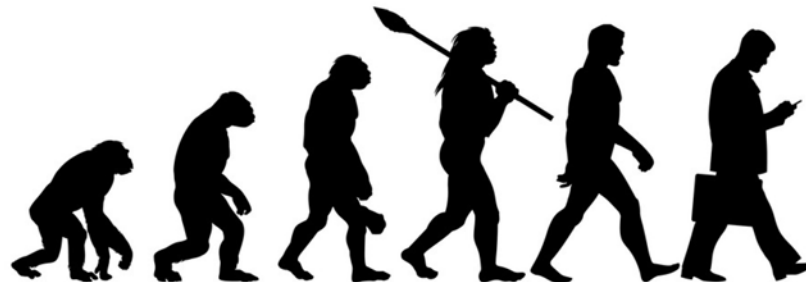
$$H(y_t) = y_t - E[y_t | \phi_t, \Omega_t] |_{\phi_t=1} = w_t - w_{t-1}$$



The evolutionary happiness function

(Gary Becker and Luis Rayo, University of Chicago):

- Our evolution has been driven by an '**orientation towards dissatisfaction**'.
- We compare what we have now, with what we had before, and what we might have in the future...as well as what others have.
- Our goals, in terms of what might make us 'happy' are constantly changing.





“social connections are really good for us and loneliness kills”

“those, who at 50, said they felt they had at least one person they could count on in times of need, were physically healthier, mentally sharper and in a lot of case, still living when their more isolated counterparts had passed.”

“Nothing matters more than our relationships with other people”

Charles Montgomery, Happy City



- Few opportunities for positive social interaction
- Feelings of isolation and distrust

“communication between people requires a reasonable amount of space”


Jan Gehl, Cities for People

“when a person is in a situation where he or she is unable to regulate who, when or where they’ll meet others, he is or she is likely to experience both isolation and over-stimulation”

David Halpern, Mental Health and the Built Environment

- Private shared spaces, gardens, courtyards
- Encourage mixed use on ground floor with transparent facades
- Encourage people to stay through seating and shelter
- Multigenerational recreational areas



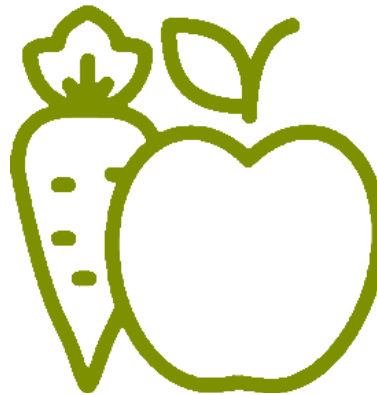
A large, gnarled tree with thick branches dominates the right side of the frame. The background is a lush forest with a mountain visible in the distance, all bathed in a warm, golden light from the sun, which is partially visible in the upper left corner.

*“just living is not enough,” said the butterfly,
“one must have sunshine, freedom and a little flower.”*

Hans Christian Anderson, The Complete Fairytales

Biophillia – a genetic urge to connect with nature

- Human Environment of Evolutionary Adaptation (EEA)
- Significant impact on evolution of brain

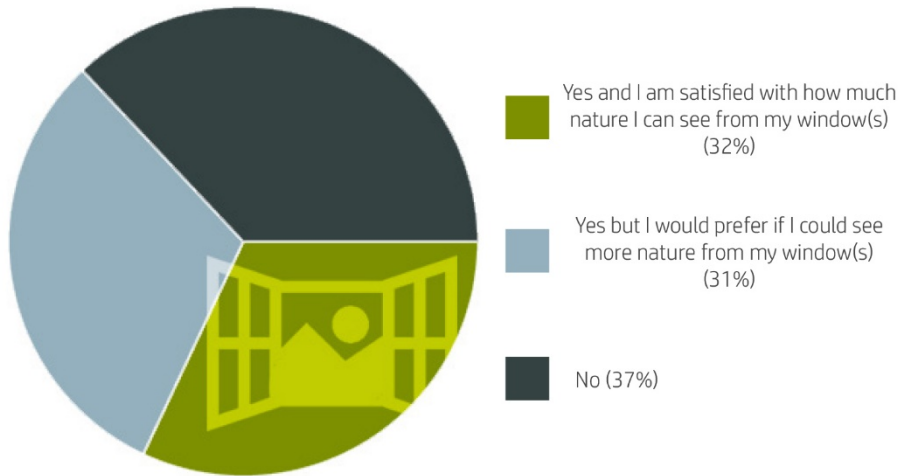


“this vulnerability presumably explains why mental disorders are one of the main health problems of Western societies”

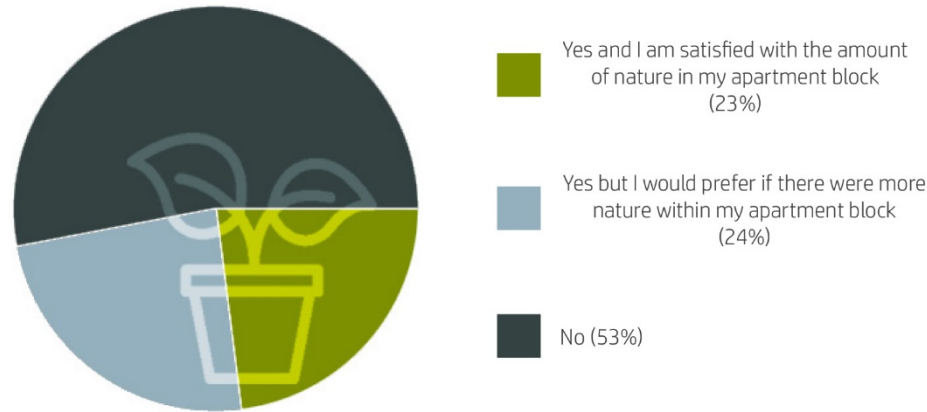
B Grinde and G Patil, Biophilia: Does Visual Contact with Nature Impact on Health and Well-Being? International Journal of Environmental Research and Public Health



Do you have a view of nature from your window(s)? E.g. trees, planting, lake, park



Does your apartment building provide you with access to nature? E.g. planting, roof gardens



Survey comments:

“We have an amazing view of tree tops and gardens. It’s the reason we wanted to rent this place.”

“We are not allowed to hang things outside the flat; it would be nice to be allowed window boxes.”

“There is some landscaping but it doesn’t encourage biodiversity or socialisation. Chosen for its low maintenance but doesn’t do anything for anyone”

“It is a significant negative to our living environment, a communal garden would a be vast improvement.”

“the degree of psychological benefit [from access to nature] was positively related to species richness of plants and to a lesser extent of birds.”

N Dunnet, C Swanwick, H Wooley, Improving Urban Parks, Play Areas and Green Spaces,
Department of Landscape, University of Sheffield



Daylighting, Light and Noise Pollution

Insomnia: Light pollution and sleeping pill use may be linked

New research, published in the *Journal of Clinical Sleep Medicine*, suggests that nighttime exposure to artificial outdoor light, known as light pollution, may raise the risk of insomnia.

Int. J. Mol. Sci. **2014**, *15*, 23448–23500; doi:10.3390/ijms151223448

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Review

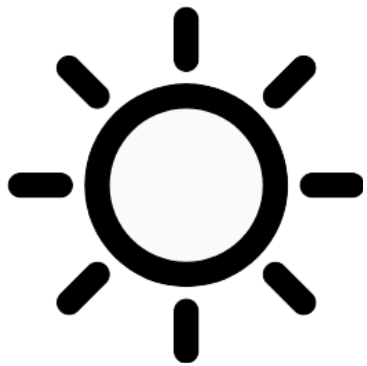
Protecting the Melatonin Rhythm through Circadian Healthy Light Exposure

Maria Angeles Bonmati-Carrion ¹, Raquel Arguelles-Prieto ¹, Maria Jose Martinez-Madrid ¹, Russel Reiter ², Ruediger Hardeland ³, Maria Angeles Rol ^{1,*} and Juan Antonio Madrid ¹

Circadian rhythm

- Controls many biological processes
- Impacted by light

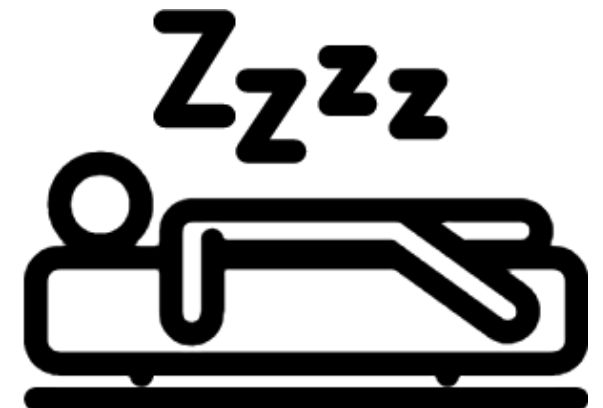




cortisol



melatonin



Chronodisruption – disrupting the circadian rhythm

- Diabetes, obesity, heart disease, premature ageing, cancers
- Impacted by light
- Reduce residents exposure to light pollution; reduce amount of light pollution residents produce



Daylighting, Light and Noise Pollution

Noise of modern life blamed for thousands of heart deaths

- Stress of exposure adds to risks, says WHO report
- Light traffic is enough for chronic levels at night

Noise pollution is one of the biggest health risks in city life

24 May 2018

High Blood Pressure and Long-Term Exposure to Indoor Noise and Air Pollution from Road Traffic

Maria Foraster,^{1,2,3} Nino Künzli,^{4,5} Inmaculada Aguilera,^{1,2} Marcela Rivera,⁶ David Agis,^{1,2} Joan Vila,^{2,7} Laura Bouso,^{1,2} Alexandre Deltell,^{8,9} Jaume Marrugat,⁷ Rafel Ramos,^{10,11} Jordi Sunyer,^{1,2} Roberto Elosua,⁷ and Xavier Basagaña^{1,2}

Sonic doom: how noise pollution kills thousands each year

Noise pollution

- Diabetes, obesity, heart disease, premature ageing, cancers
- Impacts health and wellbeing even during sleep
- Damage starts at 50dB (sound of light traffic)



90% of world's children are breathing toxic air, WHO study finds

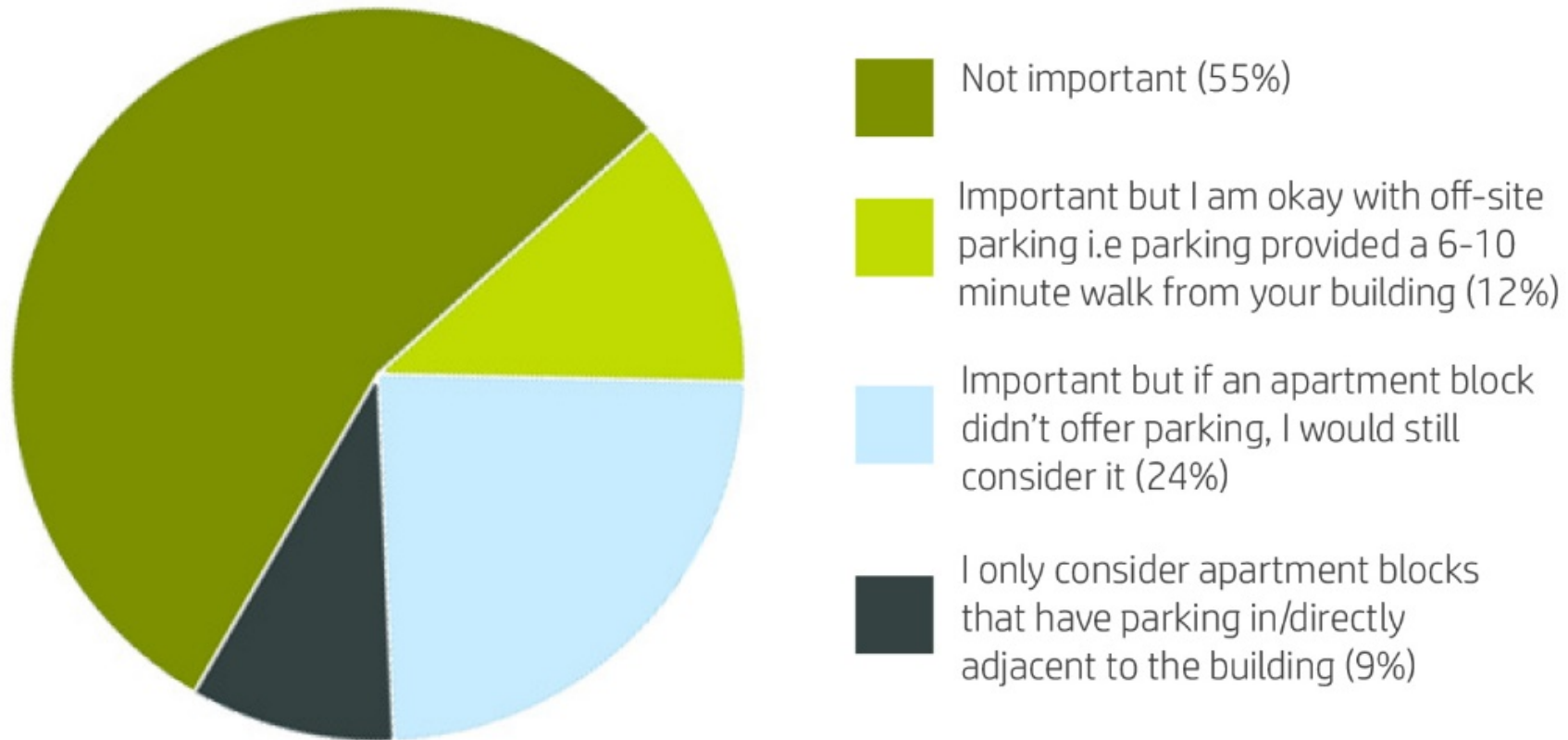
Report says air pollution is having a devastating impact on children worldwide, storing up a public health time bomb

Too dirty to breathe: can London clean up its toxic air?

Air pollution may harm cognitive intelligence, study says

Air pollution linked to higher risk of dementia, study suggests

How important is it to you that your place of residence has car parking?



*“Changes in dietary and physical activity patterns are often the result of environmental and societal changes associated with development and lack of supportive policies in sectors such as health, agriculture, transport, **urban planning**, environment, food processing, distribution, marketing, and education.”*

*“Improving dietary habits is a societal, not just an individual problem. Therefore, it demands a population-based, **multi-sectoral, multi-disciplinary,** and culturally relevant approach.”*

World Health Organisation

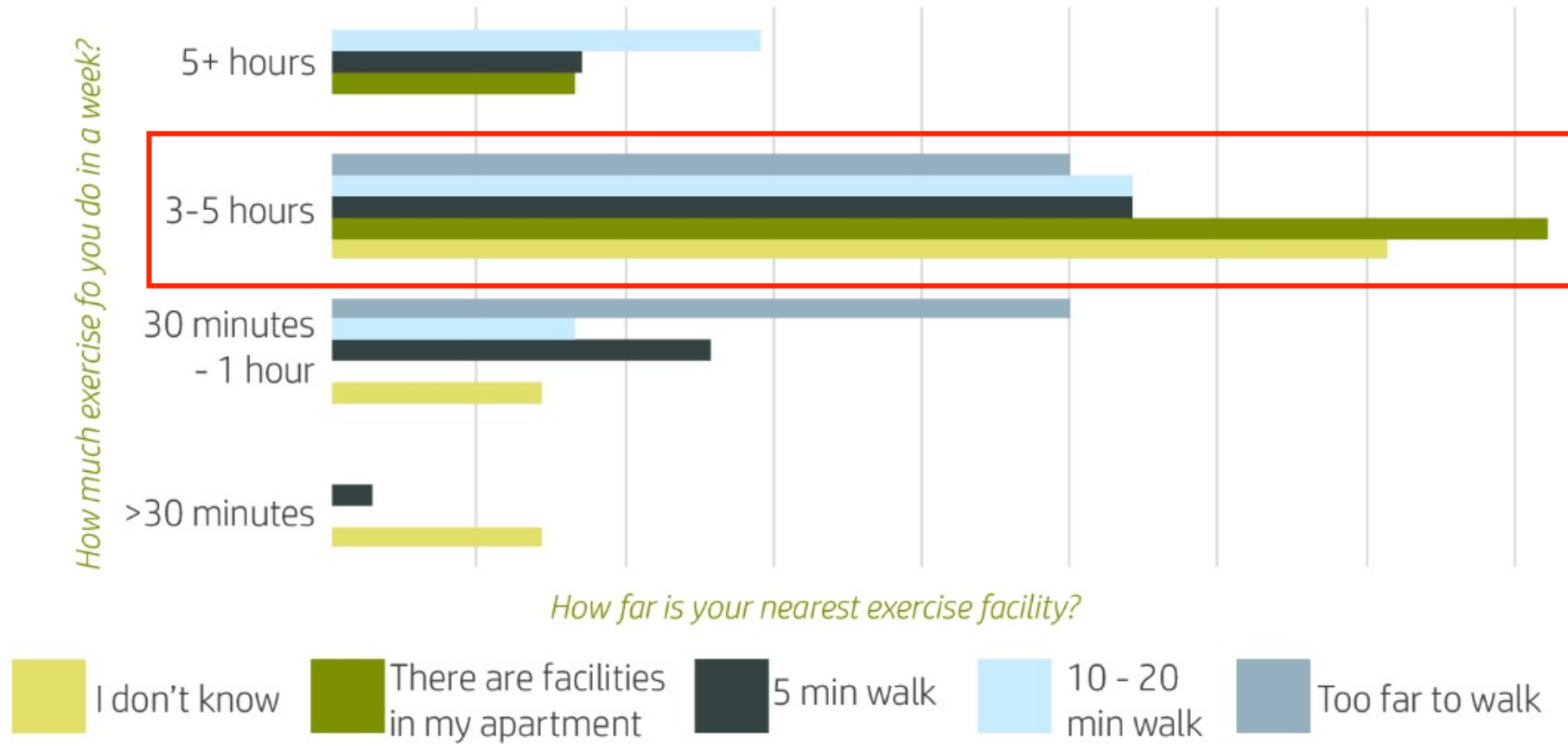
“living in a non-walkable neighbourhood has a significant impact on one’s health, amounting to on average ‘about 7 pounds of body weight.’”

R.J Jackson, The impact of the built environment on health: An emerging field.

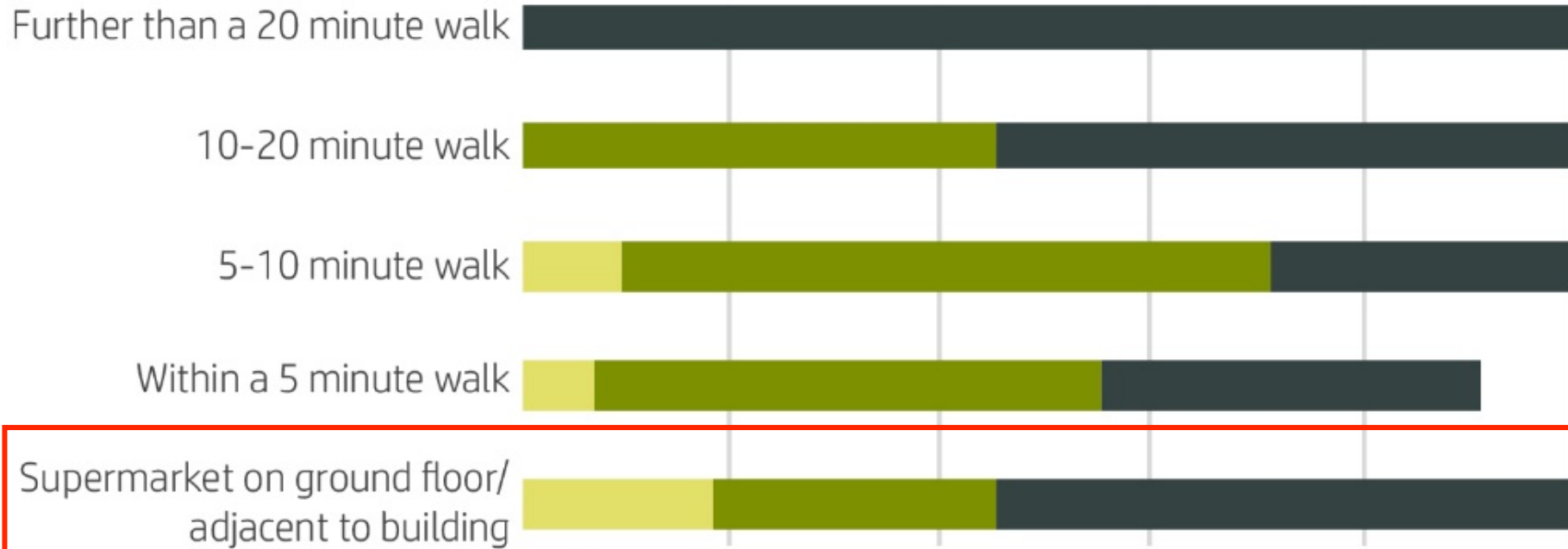
52% of adults in the UK walk 2000 steps or less a day, which is less than a mile

Cancer Research UK

Comparing how much people exercise to how far they live from their nearest exercise facility



How close is your nearest supermarket?

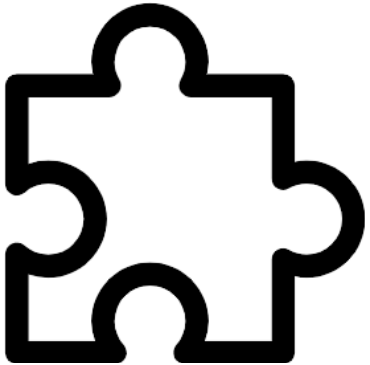


On average, how many times a month do you eat ready meals or takeaway food?



1. Masterplan level vs Apartment level

Orientation, aspect, adjacency, surrounding use



*“Sometimes the plots that are drawn within a masterplan maybe don’t suit, people haven’t thought about the **depth of plan of the building** and how the building might be configured”*

*“It’s quite difficult if you have to take on that apartment scheme, to **design out that adjacency.**”*

*“You have to try and be robust with your masterplans but it’s **not always possible to foresee every eventuality.**”*

*“You’re looking at the wider area and the relationships between different zones and uses. I think that **sets down a framework and constraints** to deal with later.”*

2. Education, Advocation, Research



*“We need to be more proactive in **pushing ideas** and we need **more research and development** so that we can back up ideas with evidence. Clients are much more likely to listen to an idea if you can back it up with evidence.”*

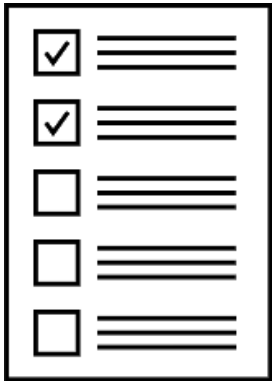
*“We can **advocate** for it as much as possible regardless of what the outcome is. I think the more people talk about it, the more important it is.”*

*“I do think though that this is becoming a bigger thing, although it’s slow, **things are starting to change.**”*

*“There’s a difference between what agents might say based on their experience of the existing conditions of the market and the reality of the younger generations who are the next set of occupiers, buyers and tenants, who have a **different view on the world.**”*

2. Regulatory Change

We must make it harder to build unhealthy homes



*“but if it’s not a stipulated, statutory requirement, there are some clients who wouldn’t put that private space in if they didn’t have to, because **they’d see it as a cost rather than a value item.**”*

*“Quite often, you find that you go through a process of having to justify to the planners that you’re meeting those requirements, but being **pushed by your client to minimise them.**”*

*“Some [clients] will look at whether there’s an edge to the scheme if you go beyond the standard, but generally speaking **it’s driven by the kind of statutory minimum requirements quite often.**”*

*“I think some of it **comes down to government regulation** and pushing for it from above because if there are clear benefits to it for the government, in terms of the healthier your population is, the less of an impact you have on the NHS”*

Child's asthma death linked to illegal levels of air pollution

'Striking association' found between nine-year-old's hospital admissions and local spikes in air pollution



▲ Ella Kissi-Debrah, who died from breathing difficulties relating to her asthma in 2013. She lived in Hither Green, south London, near the busy South Circular Road. Photograph: The Ella Roberta Family Foundation

Housing approved despite pollution warning to keep windows shut

Air assessment finds pollution levels in London development far exceed legal limit



▲ Pollution haze over south-east London. Photograph: Matt Dunham/AP

Lewisham, 2019

*“Some people, like me, arrive in the happy city by accident. Some seek it in desperation.
Some build it. Some fight for it.*

*They realise that their place in the city, and the ways in which they move, have tremendous
power to shape their own lives, the life of their city and the future of their world.*

***They realise that the happy city, the low carbon city and the city that will save us are
the same place, and that they have the wherewithal to create it.”***

Charles Montgomery, Happy City

*“We Do Not Inherit the Earth from Our Ancestors;
We Borrow It from Our Children”*

Native American Proverb