

AirRated

2023

Vol.3

Featuring:

Our biggest survey on indoor air quality (IAQ) yet, plus trends over the past 3 years across:

IAQ awareness in the UK and US

IAQ in the workplace

What employees think about IAQ

What organisations are doing about IAQ

Tension in the air: where they don't agree



Our Air in Review:

The workplace edition

Explore our most comprehensive workplace air quality survey ever with relevant trends throughout the UK and US from the past three years

AirRated™ was born out of the desire to empower humanity with the knowledge of the air they are breathing and the power to change it. Exposure to poor air quality can have a hugely adverse impact on our health, wellbeing, and productivity. We help our clients to promote healthy spaces by raising awareness of the importance of indoor air quality and providing strategies for improvement.



Why commission a survey on indoor air quality?

Our mission is to create transparency about the spaces in which we live and work. We want to help as many people as possible understand more about indoor air quality (IAQ) and empower us to make informed choices on where we live, work and play, helping us to improve our health, wellbeing and productivity.

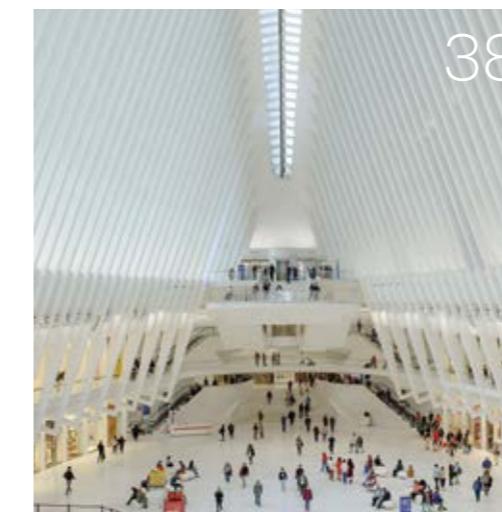
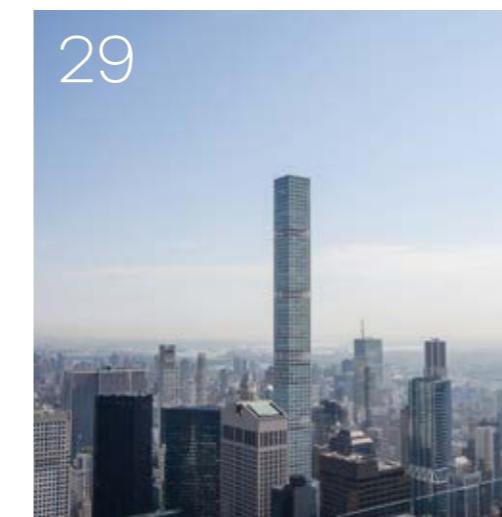
We're passionate about making data and information about indoor air quality available to everyone, and our annual survey allows us to better understand how people view indoor air quality as well as its impact on our lives within the context of our working environment.

We built on data we've collected over the past three years to further contextualise the impact and importance of indoor air quality within the workplace, across the various stakeholders within an organisation.

AirRated™

Get involved: www.airrated.co

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A note from the CEO

On 12th March 2023, we celebrated AirRated's three year anniversary. Needless to say, a lot has happened in our first few years of existence, particularly in the world of indoor air quality (IAQ).

Once considered a 'dark art', IAQ has now gained well-deserved attention in mainstream media, with growing awareness and understanding about the spaces in which we live, work and play. We've even seen a rise in IAQ-focused consumer products on our shelves! More importantly, IAQ has been recognised as a fundamental component of our lives in the built environment.

"IAQ has now gained well-deserved attention in mainstream media, with growing awareness and understanding about the spaces in which we live, work and play."

In the UK, we saw some significant moments for IAQ in 2022. On 19th May, we witnessed the start of legislative change as the Clean Air [Human Rights] Bill had its first reading in the House of Lords. In December 2022, the Bill – also known as Ella's Law – successfully passed through the UK Parliament's House of Lords and is currently waiting for a second reading in the House of Commons. A month after the initial reading of Ella's law, Part F Building Regulations were updated for the first time since 2010. Part F now states a mandatory requirement for carbon dioxide monitoring in all new or heavily refurbished non-domestic buildings. This approved document took effect on 15th June 2022 for use in England, and hopefully marks the first of more monitoring requirements for our indoor environments.

The UK isn't the only country to have seen increased attention and action regarding IAQ. In October 2022,

"AirRated's core mission has always been to increase awareness and knowledge – getting the right information to the right people."

the White House hosted a summit on improving indoor air quality. Public health and ventilation experts, private sector and education leaders, and other stakeholders were all in attendance, with a specific focus placed on the importance of all building operators doing their part. Earlier the same year, the Administration launched the Clean Air in Buildings Challenge, a set of guiding principles for building owners and operators to follow to improve indoor air quality.

In the same vein, AirRated's core mission has always been to increase awareness and knowledge of this incredibly important topic – getting the right information to the right people.

And so, continuing the great success that has been Our Air in Review, I am delighted to welcome you to the third edition of our annual report: 'Our Air in Review: The Workplace Edition'. For the past couple of years, we have consolidated lots of useful information, news and insight into one place. This year, we are switching things up a bit.

We are looking at commercial real estate (CRE) through the lens of building users, employees and decision-makers. Unearthing patterns and trends in

behaviour and attitude towards IAQ and highlighting areas where employees and decision-makers are not always on the same page. Following this report, there will be a series of interviews and thought leadership pieces to comment on these findings and add 'real world' anecdotes and insight.

We hope that this report provides food for thought and resonates with you in some way.

If you have any thoughts, questions, feedback or would like to participate in our follow-up content, please feel free to get in touch with me or the AirRated team: the email address is at the back of the report. We'd love to hear from you.

Thank you.

Francesca Brady
CEO at AirRated™



About the survey

Overview

AirRated's indoor air quality (IAQ) survey first started in 2020 at the height of the COVID pandemic. After launching AirRated™ earlier that year we were keen to better understand how the pandemic, as well as mainstream media coverage, had impacted the awareness and understanding of IAQ.

Three years on from our first survey, our yearly report looks at the wider trends surrounding air quality in the UK and US, particularly within indoor environments. This year we have shifted our focus to the workplace, surveying employees and decision-makers within commercial real estate to understand whether indoor air quality continues its momentum in becoming a key factor in the choice of commercial space and behavioural change within the workplace.

Our mission is to create transparency about the spaces in which we live and work. We want to help as many people as possible understand more about indoor air quality and empower us to make informed choices on where we live, work and play, helping us to improve our health, wellbeing and productivity.

We hope our survey provides you with a greater understanding and context of the impact that IAQ has on our lives, how it's perceived within the workplace and how we can better understand each other to create the work environments of the future.

Before we dive into the results, we wanted to share our methodology and how the data we collected can help you.

The data

This year, we've interviewed more people than ever before, giving us the best statistical analysis, margins of error and insight into our workplaces we've ever had. Find a breakdown of the key numbers in our chart to the right.

Everyone interviewed was surveyed independently across a wide range of professions to give an accurate representation of employees and decision-makers with requirements for the use, purchase or leasing of commercial office space.

Interviewing over 1,400 people, this year's survey is our biggest yet, making it the most comprehensive survey into indoor air quality within the workplace we've ever conducted.

How this data can help you

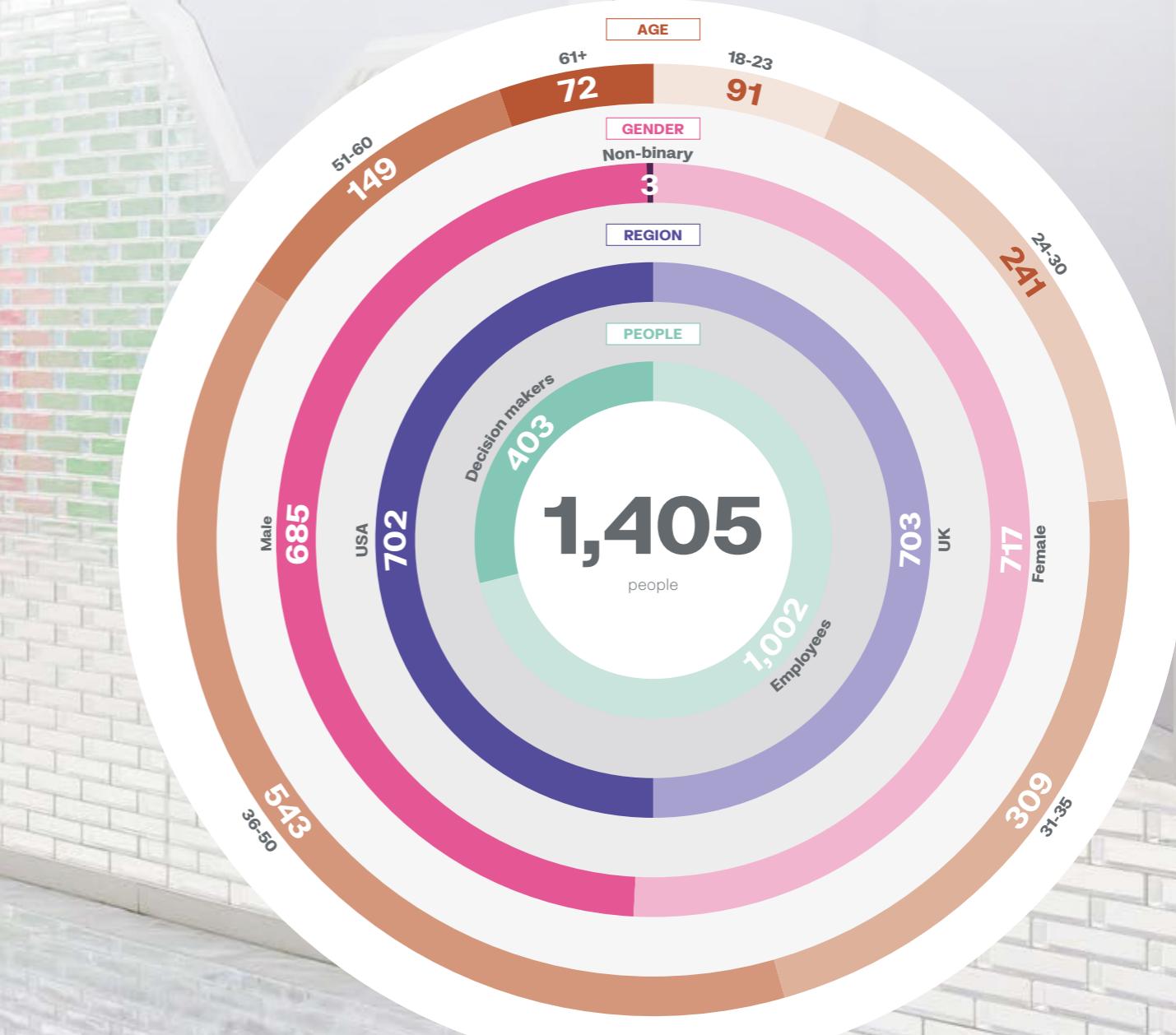
We asked a series of questions to both core audiences of employees and decision makers to gather insights into their opinions of IAQ ranging from general awareness to what aspects of a building were important to them when it came to their place of work.

We built on key questions we asked in previous surveys to not only convey trends over the past 3 years but also new questions to further contextualise the impact and importance of indoor air quality within the workplace, across the various stakeholders within an organisation.

Ultimately, we wanted to understand whether there's a disconnect between employees and decision-makers and where there are opportunities to increase understanding across organisations. We wanted to get answers to questions that empower both employees and decision-makers with the context that can help them make better decisions regarding their buildings and workplaces and ultimately improve their health, well-being and productivity.

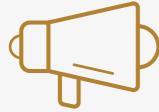
"We wanted to get answers to questions that empower both employees and decision-makers... and ultimately improve their health, well-being and productivity"

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Key findings

Here are some top-line themes uncovered from this research that you'll explore within this report.



Awareness of IAQ may be higher than you think

IAQ awareness continues to grow, however businesses underestimate the awareness and concern of their employees around the health of their commercial space.

PG

12



Is location still king? Most employees would prioritise the health of a building

Healthy buildings are a priority for employees when choosing where they work and who they work for.

PG

23



IAQ could be impacting the attraction and retention of staff

A company's transparency – or lack thereof – about the quality of their indoor air could be influencing talent's decision to work for them.

PG

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The cost of creating and maintaining a healthy building is the greatest challenge

Business decision-makers suggest that you can put a price on the health and wellbeing of office-goers: is this justified?

PG

30



Occupiers will pay more for a healthy workspace

Healthy building certifications encourage employees to come to the office (78%) and attract an 18% premium on the cost of commercial space.

PG

32



State of play: IAQ awareness in the UK and US

Intro to air quality

Our goal is to raise awareness of the importance of both indoor and outdoor air quality. We want to ensure that everyone is more conscious of the quality of the air they breathe and how this may be impacting their health, productivity and overall wellbeing.

We believe that education is one of the most powerful tools we have in our fight against air pollution, which is why we have included this section at the start of our report. It condenses the things we talk about every day in a single place and makes them accessible, digestible and easy to understand.

What are the causes of air pollution?

When air pollution is discussed, the conversation usually focuses on man-made sources, but there are various pollutants that can be attributed to the natural environment. This includes sources such as smoke from wildfires, ash from volcanoes, dust from sandstorms and salt from sea spray.

Most air pollution, however, is anthropogenic – meaning that it is caused by human activity.

Fossil fuels

The combustion of fossil fuels – coal, crude oil, and natural gas – is one of the main sources of air pollution. In fact, these fuels begin polluting our air long before they're even burned when they are mined, transported and processed. When burned to produce energy for electricity and transportation, fossil fuels emit a number of air pollutants, including carbon monoxide, carbon dioxide, sulphur dioxide and particulate matter.

Agriculture

The use of pesticides and fertilisers to grow mass-produced crops emit pollutants, such as ammonia and nitrous oxide, into the surrounding air. Other significant contributors to poor air quality include animal waste and the entire livestock production process, including the raw materials, fossil fuels and deforestation involved.

Transport

Transport is one of the main sources of air pollution, contributing to over half of all nitrous oxide emissions globally. Traffic-related air pollution (TRAP) is one of the biggest offenders in this category, particularly in urban areas. Another major offender is the aviation sector – if it were a country, it would be the sixth largest producer of greenhouse gas emissions.

Waste disposal

Improper disposal of waste can be a significant source of air pollution, as dangerous chemicals are released into the surrounding air. Burning the waste of four of the biggest contributors to plastic pollution – CocaCola, PepsiCo, Unilever and Nestlé – generates a staggering 4.6 million tonnes of carbon dioxide annually.

Indoor sources

Pollutants are often generated and accumulate indoors, causing poor indoor air quality in our homes, offices, and public spaces.

Sources include:

- Chemicals from cleaning products, varnishes, air fresheners, candles
- Mould
- CO₂ from building occupants
- Tobacco smoke
- Dust and animal dander
- Asbestos in building materials
- Dust mites
- Gases and PM2.5 from cooking

Environmental factors include:

- Inadequate temperature
- High or low humidity
- Insufficient ventilation

What are the effects of air pollution?

Air pollution can affect anyone at any stage of their life, causing a wide and complex range of health issues. In some cases, damage can be gradual and may not become apparent for many years.

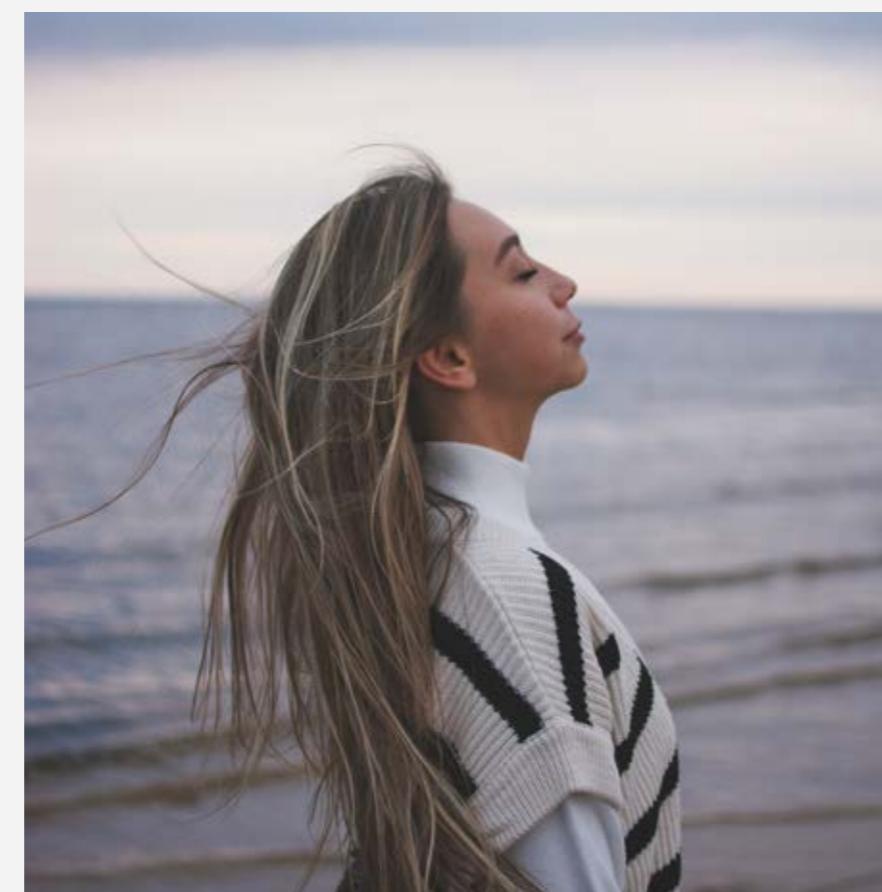
Short-term effects include:

- Respiratory illnesses like pneumonia and bronchitis
- Irritation of nasal passages, airways, eyes and skin
- Headaches, dizziness and nausea
- Coughing, sneezing, shortness of breath
- Exacerbation of asthma

Long-term effects include:

- Strokes
- Cardiovascular disease
- Respiratory disease
- Lung cancer
- Reduced life expectancy

Air pollution is a complex topic that is still being widely researched. Emerging evidence suggests that air pollution may have links to cognitive function, causing premature decline, dementia, and mental health issues in children.



What are the main pollutants?

Many particles and gases, both natural and man-made, contribute to air pollution. Exposure to different pollutants vary in terms of severity of health and environmental effects, but long-term exposure to any of the key pollutants can cause significant health implications, and sometimes even be fatal. The World Health Organization (WHO) recently published updated air quality guidelines relating to the key air pollutants, which governments can work towards to improve the quality of our air.

**Particulate matter**

The term particulate matter (PM) describes a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope.

**Nitrogen dioxide**

Nitrogen dioxide (NO₂) is a highly reactive gas that is produced alongside nitric oxide (NO): together they are known as nitrogen oxides or oxides of nitrogen (NO_x). NO₂ is caused by combustion, primarily the combustion of fuels. The main source of these emissions comes from road vehicles, but other significant sources include power plants, industrial processes and central heating.

**Radon**

Radon (Rn) is a naturally occurring, radioactive gas that is invisible, odourless and tasteless. It is formed by the radioactive decay of the small amounts of uranium that occur naturally in rocks and soils. Once formed, it can enter buildings through cracks in walls, doors and windows.

**Carbon dioxide**

Carbon dioxide (CO₂) is a naturally occurring, colourless, odourless gas that makes up 0.04% (400ppm) of the air we breathe. Human and animal respiration and combustion are the main sources of indoor CO₂, which means concentrations are significantly higher indoors than outdoors.

**Ground-level ozone**

Ozone (O₃) is a gas found in the Earth's upper atmosphere and at ground level. Stratospheric ozone, a naturally occurring gas in the upper atmosphere, is not harmful and protects us from ultraviolet rays. At ground level, tropospheric ozone is created by chemical reactions between nitrogen oxides and VOCs – this type of ozone is a harmful pollutant.

**Total Volatile Organic Compounds**

Volatile organic compounds (VOCs) are compounds that can become gases or vapours: total volatile organic compounds (TVOCs) is the collective term referring to a group of common VOCs. Examples include acetone, benzene and formaldehyde, and they are often emitted from construction and furnishing products.

**Carbon monoxide**

Carbon monoxide (CO) is an invisible, odourless and tasteless gas. It is produced when fuels like gas, oil and coal burn without sufficient oxygen: main sources are vehicle emissions, industrial activities and cigarette smoke. There are also some natural sources of CO, including volcanoes and wildfires.

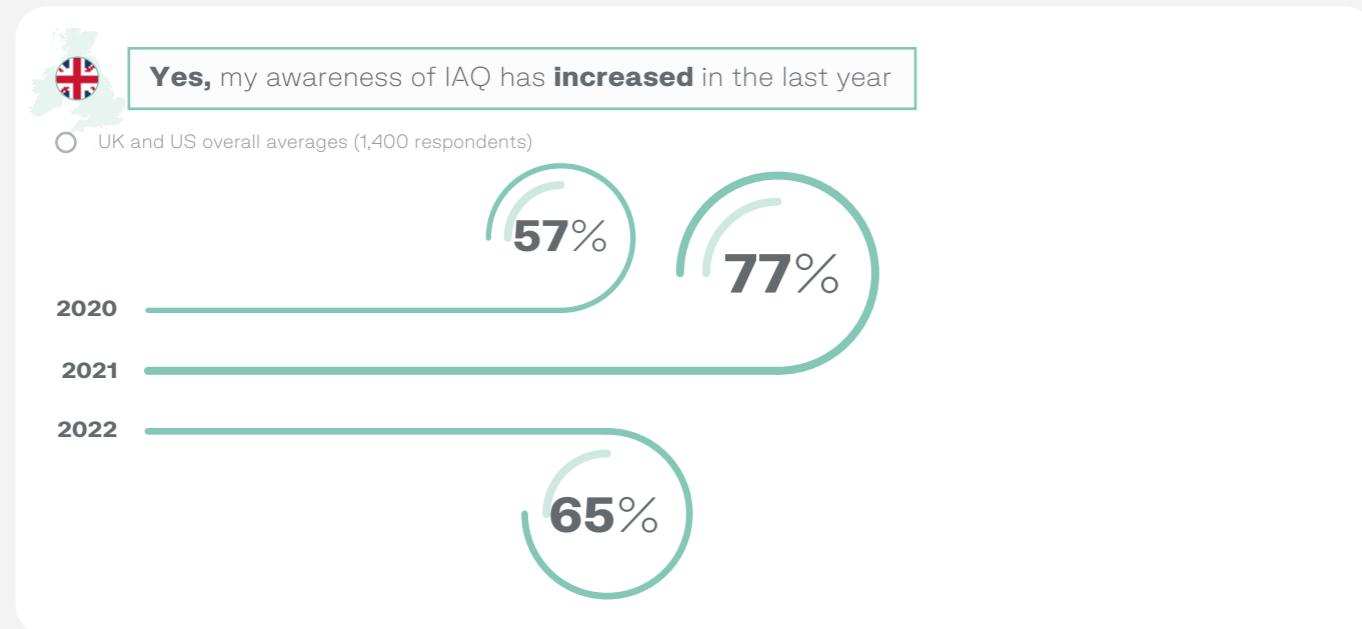
**Lead**

Lead (Pb) is a naturally occurring element which can be found in the Earth's crust. While it has some industrial uses, it has been acknowledged as a dangerous substance for decades, and can cause extreme damage to our health. Key sources of lead in the air include ore and metal processing, lead-acid battery production and piston-engine aircraft fuel. It was also commonly found in petrol for road vehicles, until it was widely banned two decades ago.

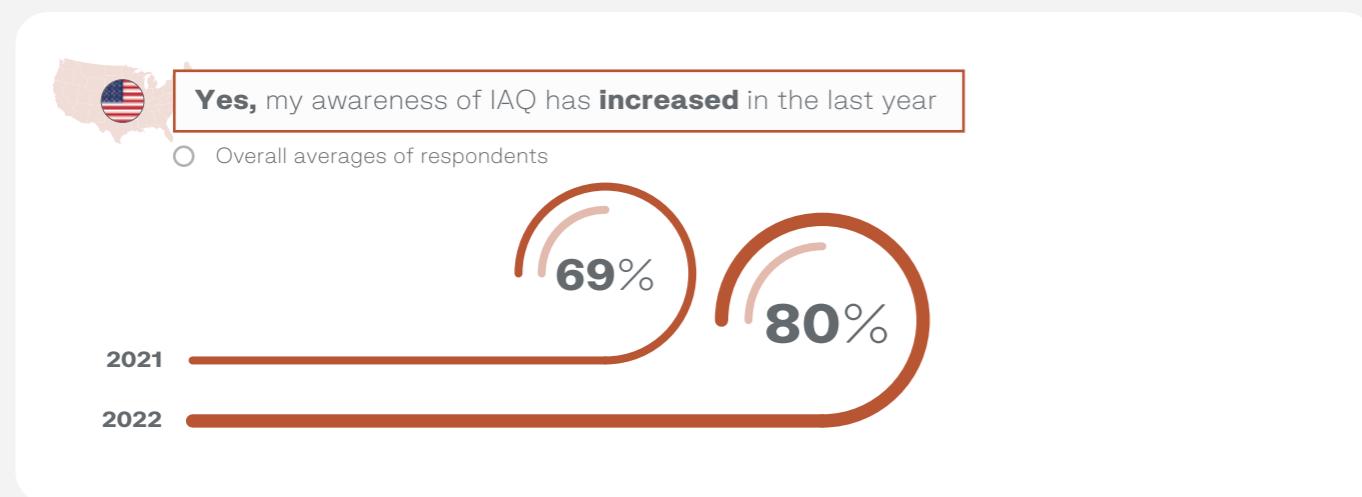
**Sulphur dioxide**

Sulphur dioxide (SO₂) is a colourless gas with a strong smell, which is produced when fuels containing sulphur, such as coal and oil, are burned. Sources of this include vehicle use, heating, and cement manufacturing; it also causes secondary air pollution by contributing to the formation of ozone, and producing sulphates through chemical reactions, which contribute to PM.

Awareness of IAQ in the UK has continued to increase since the pandemic, with 92% of people saying their awareness had either increased or maintained over the past year.



Awareness of IAQ in the US continues to increase at an increasing rate, even post-pandemic with 80% of respondents saying their awareness increased in the last year.



Relationship between indoor and outdoor air quality

When people think about poor air quality, they tend to focus on outdoor air pollutants such as car exhausts or factory fumes, and if indoor air quality is discussed, it is usually treated as a separate issue. However, the two are very much linked, and a great deal of our exposure to air pollution actually occurs when we are inside.

- We spend more than 90% of our time indoors (U.S. Environmental Protection Agency, 1989)
- Indoor concentrations of pollutants are often two to five times higher than typical outdoor concentrations (U.S. Environmental Protection Agency, 1987)
- The combined effects of ambient air pollution and household air pollution are associated with 6.7 million premature deaths annually. (World Health Organisation, 2022)

Concentrations of outdoor pollutants rise and fall constantly because of changes in weather, climate, and human activity. For example, outdoor pollutants can build up in the lower atmosphere as a result of temperature inversions. During periods of cold weather, warm air rises into the upper atmosphere and traps cold air beneath it, causing pollutants to build up at low altitudes.

Concentrations can also rise quickly in the mornings during rush hour traffic, but subside once traffic diminishes and wind and heat clear the air of excess pollutants. The Earth essentially has its very own natural air-purifying technology that spreads outdoor pollutants far and wide.

Unfortunately for humans, indoor pollutants are not always exposed to any similar processes to reduce their concentrations. Ventilation brings in outdoor air, often referred to as 'fresh air,' to dilute indoor contaminants, but this can inadvertently introduce even more pollutants to the inside environment.

Outdoor air pollutants can also infiltrate indoor air in ways that may not be immediately obvious: through open windows and doors, and cracks in walls, doors and window sealants. And to make matters worse, there are also many indoor sources that create more pollution, including everyday items like carpets, furniture and cleaning products.

Due to the fact we are indoors so much, prolonged exposure to indoor air pollution at any level can result in significant long-term health impacts. It is abundantly clear that steps need to be taken to increase awareness of the threats which are presented by indoor air pollution.

What needs to be done to improve air quality?

Air pollution might be the largest environmental public health threat on the planet, but thankfully, it is one that we can solve if we take action immediately. We need to improve education about the dangers of air pollution, while demanding greater transparency when it comes to gaining access to air quality data.

Other important steps include:

- Reducing energy consumption and burning less coal
- Lessening the impact of the transport industry
- Setting clearer, stricter and more ambitious standards
- Taking action within communities to find innovative solutions
- Enshrining the improvement of air quality in legislation

In order to improve air quality and tackle global warming, change needs to happen on a national and global scale. But actions at the individual and community level are also important – we can work together to create a healthier planet for us and generations to come.

"Air pollution might be the largest environmental public health threat on the planet, but thankfully, it is one that we can solve if we take action immediately."

Impact of air quality on health

The various harmful gases and particles that pollute our air, such as sulphur dioxide, carbon monoxide and total volatile organic compounds (TVOCs), can have serious effects on our health.

These pollutants impact our bodies in many ways, affecting key systems and organs. Many people naturally assume that the damage from air pollution is limited to the respiratory system, but research shows harm goes far beyond this, causing heart disease, different types of cancers, and impacting pregnancy and foetal development. Awareness of these health impacts is certainly growing – in this year's survey commissioned by AirRated™, 80% of respondents agreed with the statement: 'I understand how indoor air quality impacts my health.'



Emerging evidence also shows links between air pollution and cerebral function, with scientists investigating links with increased risk of severe mental illness (King's College London, 2021) and development of dementia (Alzheimer's Society, 2016).

While COVID-19 has dominated the news for the past three years, and nearly 7 million people have now lost their lives as a result (as of February 2023), the deadly health impacts of air pollution rarely make front page headlines – despite the yearly death toll being treble those caused by COVID-19.

Health effects of air pollution

The heart and circulatory system

There's abundant research showing that air pollution impedes cardiovascular function (National Center for Biotechnology Information, 2018). Toxic air has a significant and wide-reaching impact on the circulatory system and heart; according to the World Health Organization (WHO), over 20% of cardiovascular deaths are attributed to exposure to polluted air (World Heart Federation, 2019). The majority of premature deaths linked to outdoor air pollution are from heart disease and stroke.

Charities like the British Heart Foundation are also conducting ongoing research into the damage that toxic air causes to the heart. This happens when blood vessels become restricted, causing them to be narrower and harder, and blood pressure rises – all of which strain the heart. Pollutants can also increase the likelihood of blood clots and cause abnormal heart rhythm. This increases the risk of heart attack and stroke among those with existing heart conditions, and can also cause completely new heart issues to develop.

Lung function

The effects of air pollution on the lung is perhaps the most widely discussed health impact of exposure to poor air quality. Research shows that long-term exposure to air pollution can hinder proper lung development in children,

while toxic air is equally harmful to older members of the population too (King's College London, 2018).

Lung health declines steadily as we age, and inhaling air pollutants only serves to compound this deterioration. Long-term exposure to pollutants such as particulate matter, ground-level ozone and radon has been linked to the development of lung disease in later life, and can even directly cause lung cancer. A US study of over 7,000 participants between the ages of 45 and 84 years, found a direct connection between exposure to ambient air pollutants, and increasing emphysema and worsening lung function (Jama Network, 2019).

Asthma

Asthma is a lifelong condition that affects the airways of the lungs, and manifests itself through coughing, wheezing and shortness of breath. The symptoms are usually manageable and not too disruptive, but asthma attacks can be triggered by allergies or high levels of pollution, and can potentially be fatal.

According to Asthma UK, two thirds of asthma sufferers report the condition being worsened by poor air quality, which is a result of the airways being narrowed, and particulate matter being inhaled directly into the lungs.

In April 2021, scientists conducting a study at Lehigh University in Pennsylvania identified a severe type of asthma and concluded that it's likely induced by early childhood exposure to by products of burning fossil fuels. This is the first study of its kind to demonstrate air pollution as a direct cause of non-Th2, the most challenging type of asthma to control.

Cancer

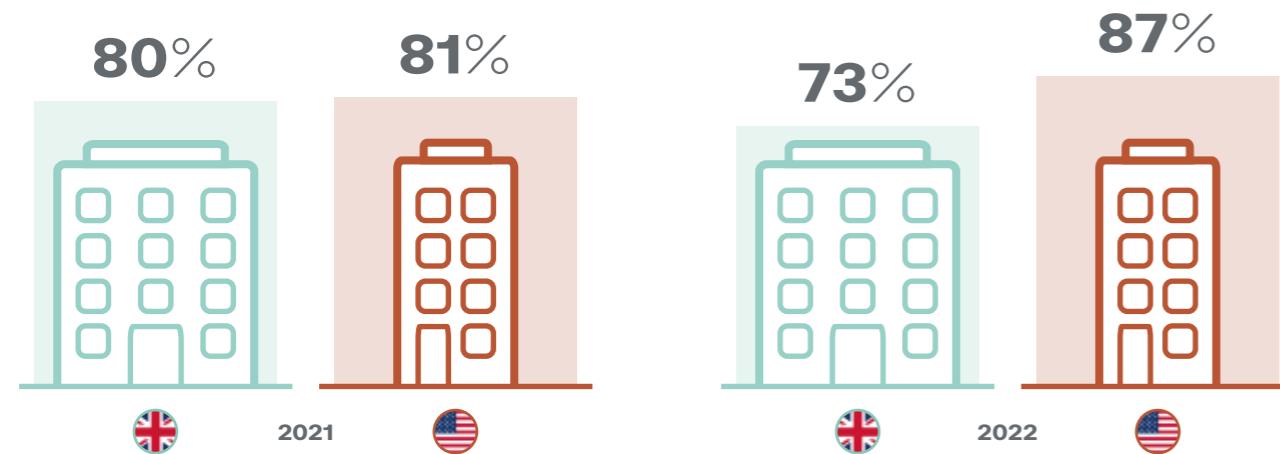
Following a China-based study, the International Agency for Research on Cancer (IARC), classified air pollution and particulate matter as carcinogens (Chinese Journal of Cancer, 2014). This means that these pollutants are direct causes of cancer in humans. The most common type of cancer associated with poor air quality is lung cancer, with risk levels being higher in built-up areas. However, a recent study carried out in Hong Kong suggests that PM2.5 could be linked to breast, liver and pancreatic cancers (Cancer Epidemiol, Biomarkers and Prevention, 2016).

“4 out of 5 respondents said that they have an understanding of how IAQ impacts their health.”

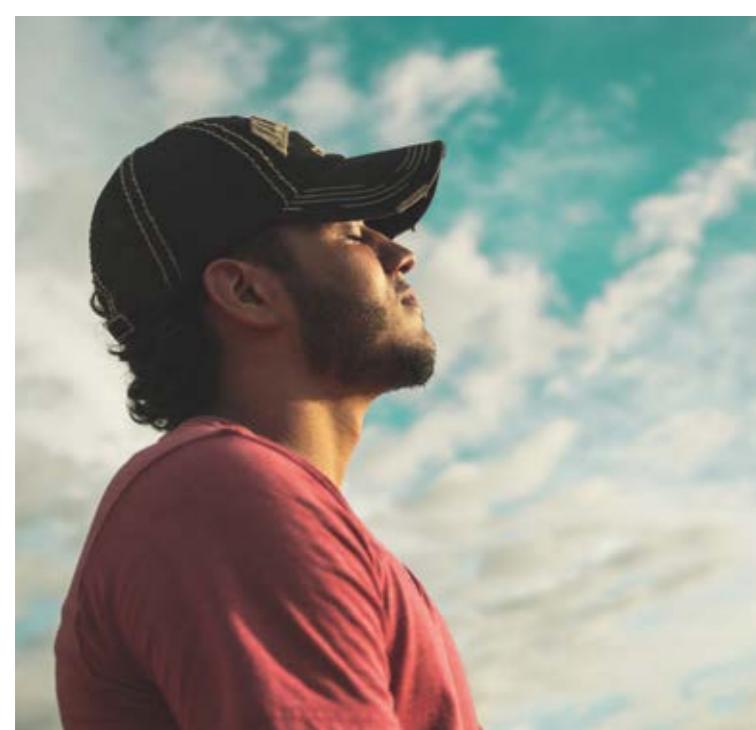
Knowledge of IAQ and health has reduced after increasing significantly over the course of the pandemic

I agree, I understand how indoor air quality impacts my health

UK and US overall averages (1,400 respondents)



 Understanding lags behind awareness, still at **80%** average, however that is 4 in every 5 stating that they understand how IAQ impacts them.



Average has maintained across both the UK and US (80%), however decision makers have seen a 7% reduction (down to 82% from 89%) in overall understanding in the past year. Employees in the US have seen a 15% increase in understanding (Up to 86% from 71%).

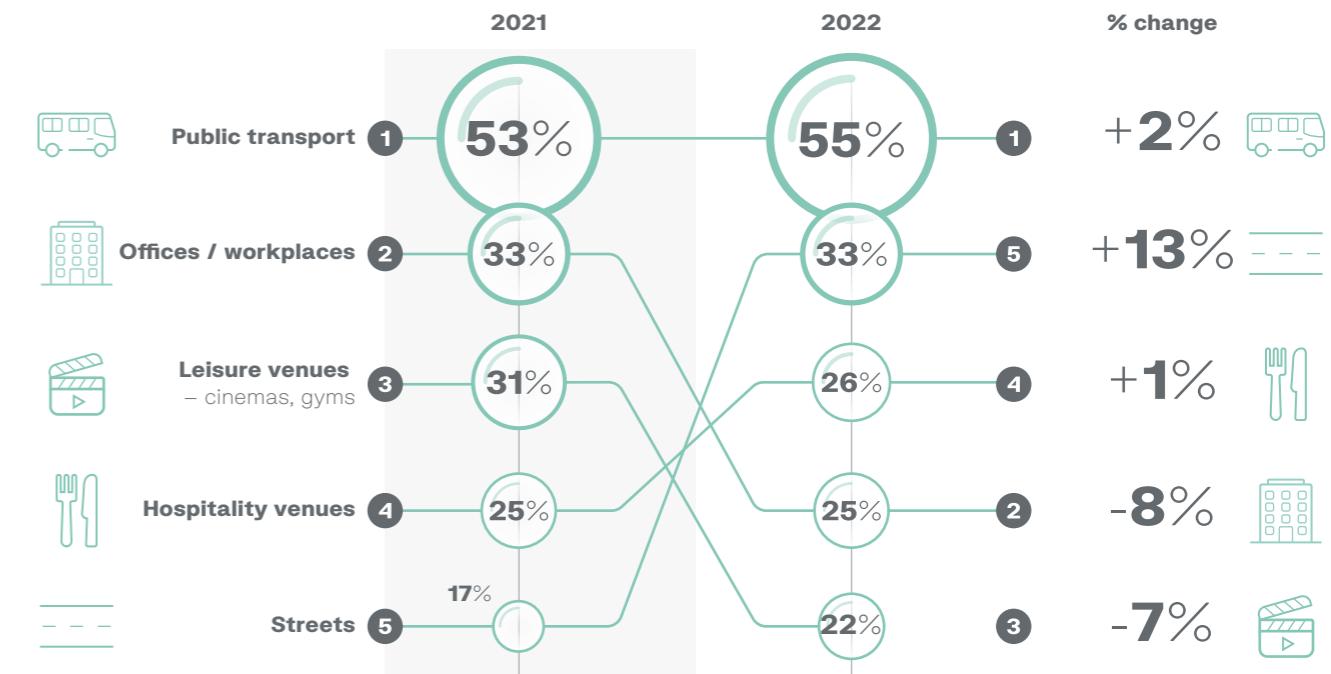
With awareness and understanding of the health impacts increasing substantially post COVID-19 (up from 44% in our 2020 survey), the slight reduction in average knowledge in the past year suggests that more needs to be done to increase awareness and continue the conversation around the health risks of poor indoor environments beyond virus transmission.

Overall, people in the UK are more concerned about air quality on public transport and in their local streets than they are about their workplaces, even though the majority of buildings have poorer air quality than outdoors



Top three spaces associated with the **greatest concern** around **air quality**

UK overall averages (700 respondents)



Interestingly outdoor spaces seem to be of increased concern, maybe due to media focus on this and more policy aimed at tackling outdoor air quality vs indoor. US has higher concern for office spaces than UK, ranking 1st vs 4th for the UK. Public transport and hospitality sits in top 3 for both.

The data suggest that those in the UK are more concerned/aware of outdoor air quality and its impact on our health, whereas the US have a greater concern towards indoor environments, particularly workplaces.

UK media coverage surrounding air pollution has, over the past year, been largely focussed on outdoor environments. With Ella's Law (the UK's Clean Air Bill) currently being discussed in parliament, the focus on

ULEZ and Clean Air Zones, as well as the impact of climate change, it makes sense that outdoor air quality would be at the forefront of concern.

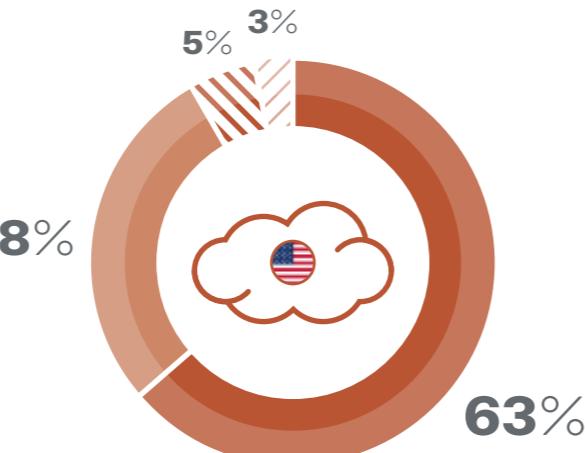
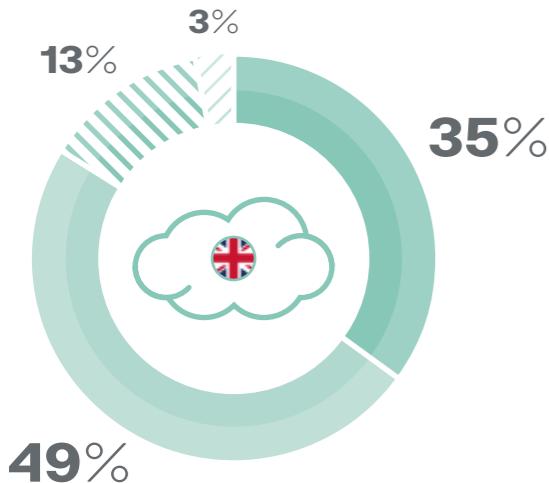
When we look at US media coverage, issues around indoor air quality have been more commonplace with the outlawing of gas stoves and the recent White House Summit on IAQ being key areas of debate.

People are taking their own action to combat health risks of poor air quality

If you knew changing your habits would reduce your exposure to air pollution, **would you do so?**

UK and US overall averages (1,400 respondents)

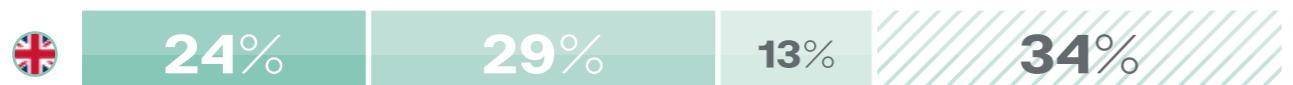
■ Yes, I would definitely ■ Yes, I would probably ■ No, I probably wouldn't ■ No, I definitely wouldn't



Have you purchased or considered purchasing some kind of air quality technology for your personal use? (Air quality monitor, air purifier, dehumidifier, ventilation)

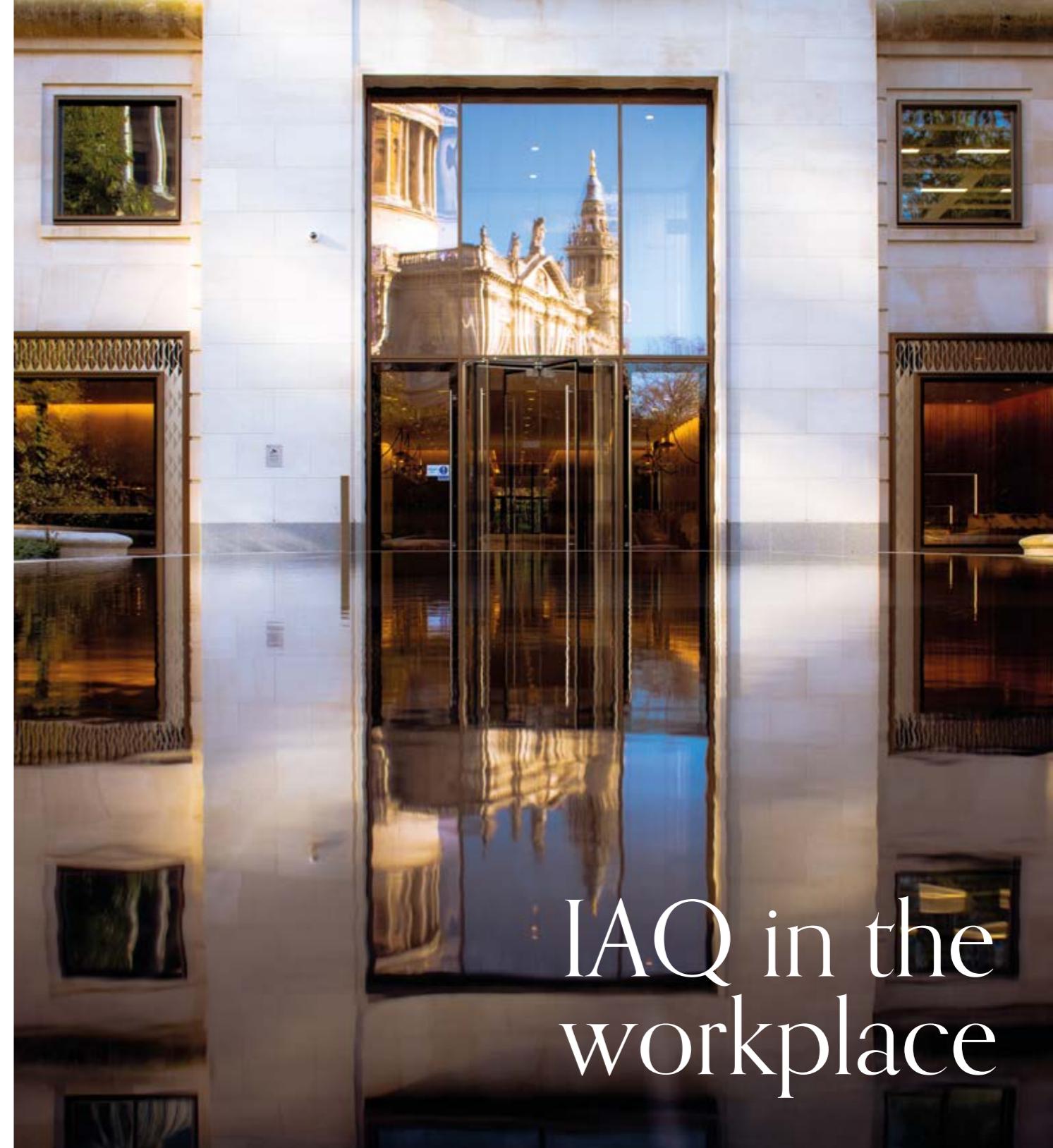
UK and US overall averages (1,400 respondents)

■ Yes, I have previously ■ Yes, I am currently ■ Yes, I am considering ■ No, I have not purchased



With 88% of respondents claiming that they would change their habits if they knew that it would reduce their exposure to air pollution, it's clear that as awareness and understanding grows, so does their appetite to make changes to their lifestyles in order to protect their health. 39% of all respondents had purchased air quality

technology, with another 39% considering purchasing technology. A staggering 91% of US respondents had either purchased or were considering purchasing air quality technology. Further results from this survey suggest that people are also concerned about the air quality within their offices or commercial spaces as well.



IAQ in the workplace

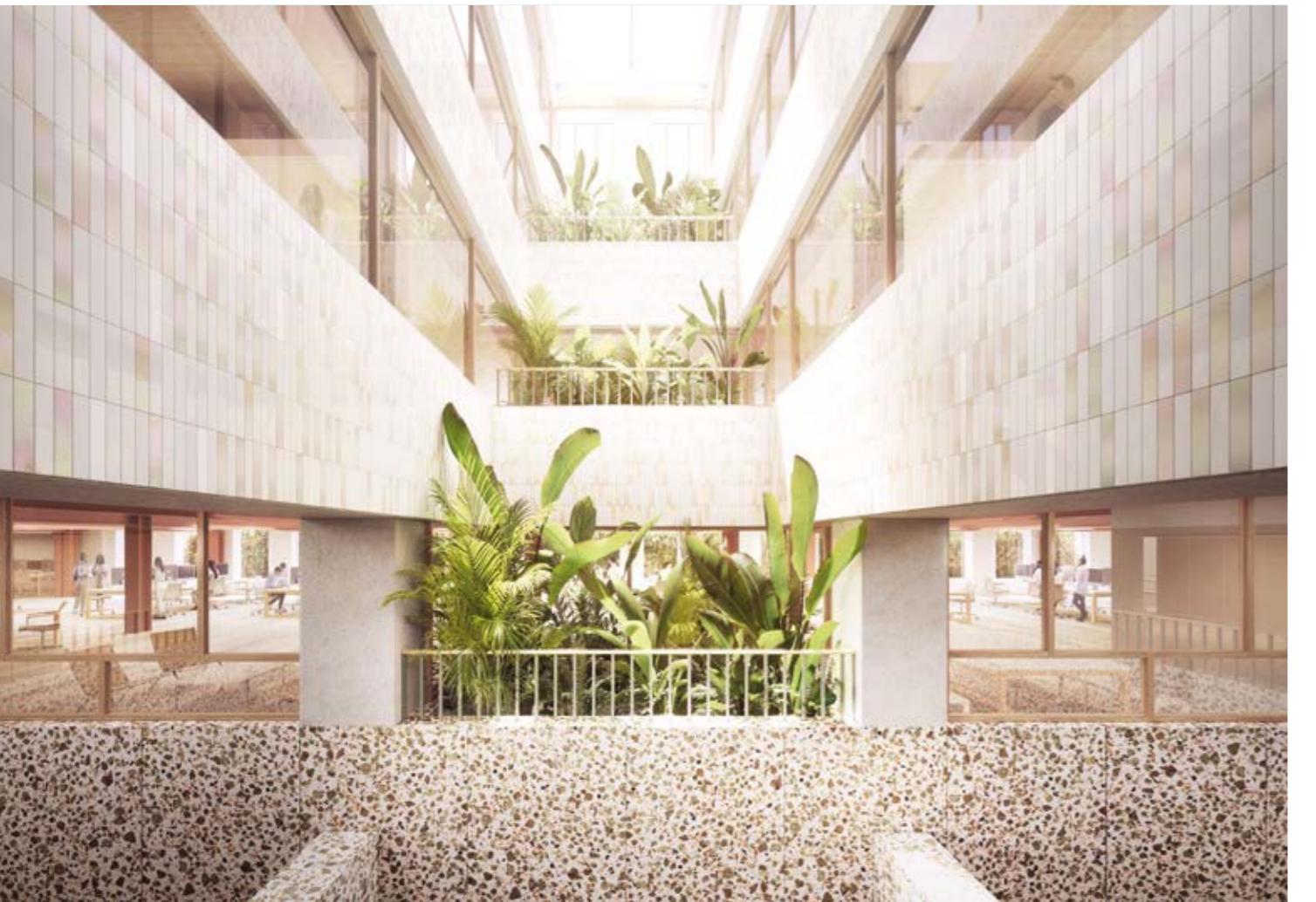
Sick Building Syndrome: How IAQ in the workplace is making us sick

From the 1960s, many occupants of newly built homes, nurseries and offices, started to report non-specific symptoms associated with the time they spent inside a building.

Complaints became so prolific that a decade later the mainstream media coined the term 'office illness.'

By 1986, WHO research estimated that 10-30% of newly built offices in the west had indoor air problems, and 'sick building syndrome' was formally identified. Respected organisations such as the Health and Safety Executive (HSE) have carried out extensive research on SBS, finding that poor indoor air quality is a major contributor.

The reason is that post-war buildings were built as airtight, centrally-heated structures, with no consideration for airflow or ventilation. Indoor air quality was simply not understood as a threat to human health.



Symptoms of SBS:

- Lung inflammation (pneumonitis)
- Tightness of the chest
- Difficulty breathing
- Allergy-type symptoms
- Itchy eyes
- Irritated airways
- Coughs and runny noses
- Fatigue
- Headaches
- Difficulty concentrating
- Body aches
- Fever
- Chill

People with preexisting respiratory or allergy problems will usually have more severe symptoms; for example, asthma sufferers may have more asthma attacks, or more serious asthma attacks and people prone to headaches may experience them more frequently or to a greater degree.

SBS and workforce effects: absenteeism and presenteeism

While SBS describes acute health and comfort symptoms linked to time spent inside a building, its effects trigger two types of behavioural changes within a workforce.

Absenteeism is the term used to describe an employee being away from work for more than is reasonable or usual; presenteeism describes being present at work, but performing at low levels due to feeling unwell.

We spend around a third of our lives in the office, or roughly 90,000 hours over an average lifetime. Academic studies have found presenteeism costs the UK economy around £4k per employee a year, as unwell people were seen to perform at only 84% of full capacity. A 2020 UK survey found that absenteeism and presenteeism combined cost the economy almost £92 billion in 2019, with productivity on the decline.

And then there's been the pandemic, which has driven a massive trend for hybrid working patterns. This, alongside a rise in time off due to mental health issues – now the biggest reason for long-term absence – means that offices need to be places that people want to return to. Employment itself has been shown to be vital for mental health while well-designed environments are regularly acknowledged for improving and protecting mental wellbeing.

How a healthy building leads to a healthy business

Workforce productivity: the COGfx Global Buildings study

Professor Joseph Allen, one of the leading experts on healthy buildings, determined absolutely that good indoor air quality increases occupant productivity and wellbeing.

“Just like we’ve made great gains in public health around sanitation, water quality, and food safety, indoor air quality is going to be part of that conversation moving forward.”

– Professor Joseph Allen, cnbc.com

Conducted by Harvard T.H. Chan School of Public Health, the three-year COGfx Global Buildings study culminated in 2017, by comparing human performance and wellbeing across 100 offices around the world.

During ‘Study 1: Indoor Environmental Quality’ – a year-long global experiment – Allen’s team placed sensors at workers’ desks, and handed them a custom-made phone app that delivered brief cognitive function tests throughout the day. Volunteers also took a short survey asking if they suffered headaches, dizziness or had trouble sleeping each day.

“When volunteers worked in well-ventilated conditions (which lowered the levels of CO₂ and VOCs), they scored 61% higher than when they worked in typical office building conditions” says Professor Allen. “When they worked in the cleanest conditions, with even lower CO₂ levels and higher ventilation rates, their scores climbed 101%”

Study 2: Buildingconomics: The Impact of Working in a Green Certified Building on Cognitive Function and Health, found that green-certified buildings increased occupant cognition by 26% and health and wellbeing overall, compared to non green-certified buildings.

For Study 3: Global Buildings, the effects of PM_{2.5} and CO₂, the team assessed 302 employees in urban office buildings in six countries (China, India, Mexico, Thailand, the United States of America, and the United Kingdom). The study took a year and concluded that for every decrease in the levels of exposure through ventilation and filtration, there is an equal increase in cognitive function.

“The results showed the biggest improvements in areas that tested how workers used information to make strategic decisions and how they plan, stay prepared, and strategise during crises.”

– Joseph G. Allen, [The Harvard Business Review](https://hbr.org)

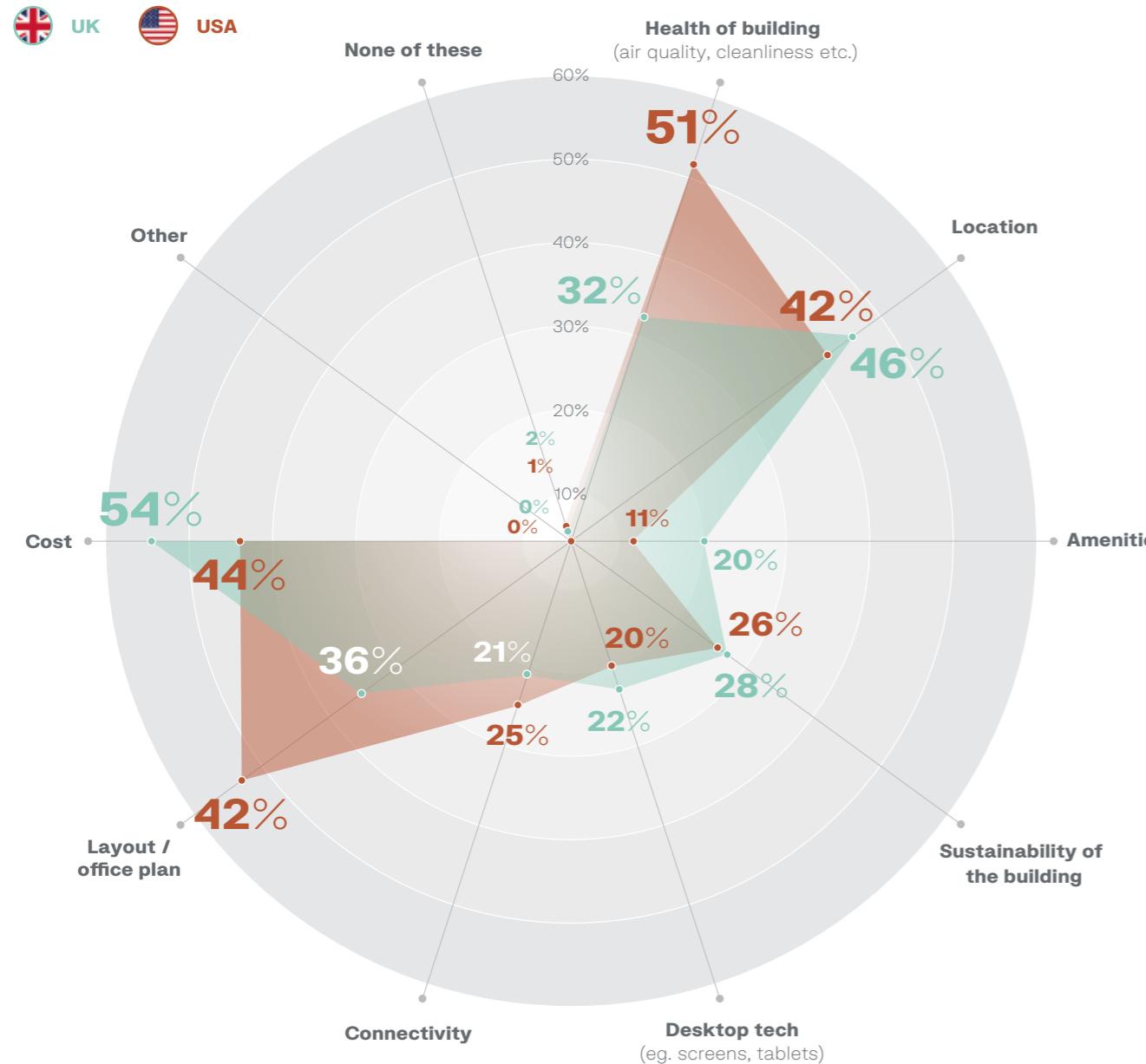
Ultimately, results showed occupants’ cognitive function test scores doubled in good indoor air environments. The cost of running better ventilation systems to heighten employee performance came in at \$14–40 per person per year, while the estimated ROI (in improved productivity in faster response times and increased accuracy), was measured at between \$6,500 and \$7,500 per person per year. Not only that, senior managers made better decisions when in healthier air environments.

More recently, in Allen’s 2020 book *Healthy Buildings: How Indoor Spaces Drive Performance and Productivity* (co-written with Harvard Business School lecturer John D. Macomber), Allen outlines the bottom-line gains of healthy air, citing research that estimates improved air quality could add \$20 billion annually to the US economy.

Where does IAQ rank in importance within the workplace?

Which of the following **office features are most important to you as a decision maker?**

UK and US decision makers (200 UK / 200 US)

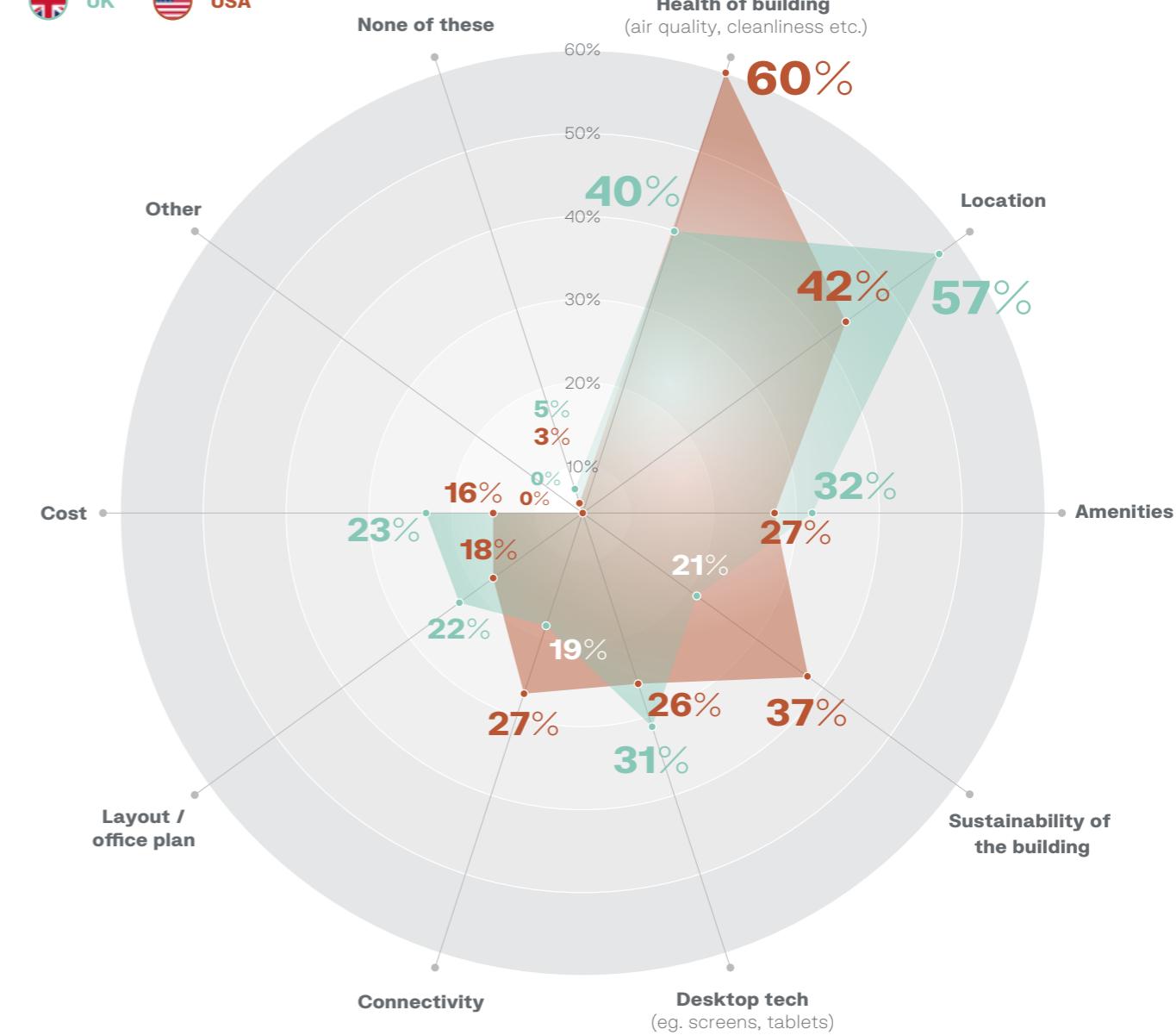


Decision makers also had health of building in their top 3 but found location and cost to be more popular features.

Which of the following **office features are most important to you as an employee?**

UK and US employees (500 UK / 500 US)

UK USA



The health of a building and location were the two top features of an office for **employee**.

Business owners and decision makers in the UK have different priorities to their employees when it comes to sourcing office space. Location and health of the building are the standout features when it comes to office space for employees vs cost and location for decision makers in the UK.

However, in the US it's a different story, with both employees and business decision makers largely aligned in prioritising the health of the building above other features.

The sustainably healthy building paradox: Sustainability continues to increase in importance for the majority of both employees and decision makers

Yes, sustainability has become more important to me in the past year.

UK and US overall averages (1,400 respondents)

2021



Sustainability and healthy buildings have long been in tension, and historically sustainability has generally trumped creating a healthy indoor environment. But that doesn't mean the two can't go hand in hand. Whilst both factors are growing in importance, it's clear that they need to be managed and balanced effectively within our workplaces. Both need to be equally considered in the decision-making process regardless of whether you are looking for commercial space for your organisation or developing or retrofitting a space.



Increase of 7% on last year's average. Rising fuel prices and media coverage of the climate crisis could have contributed to this change.

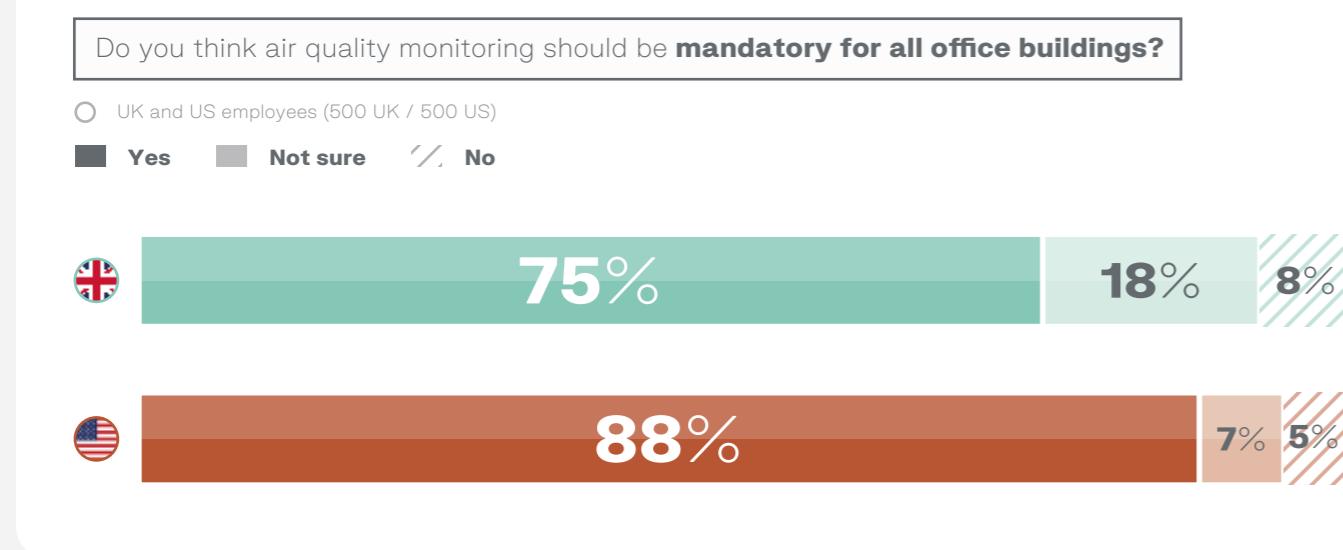


The demand for healthy buildings: The employee's view

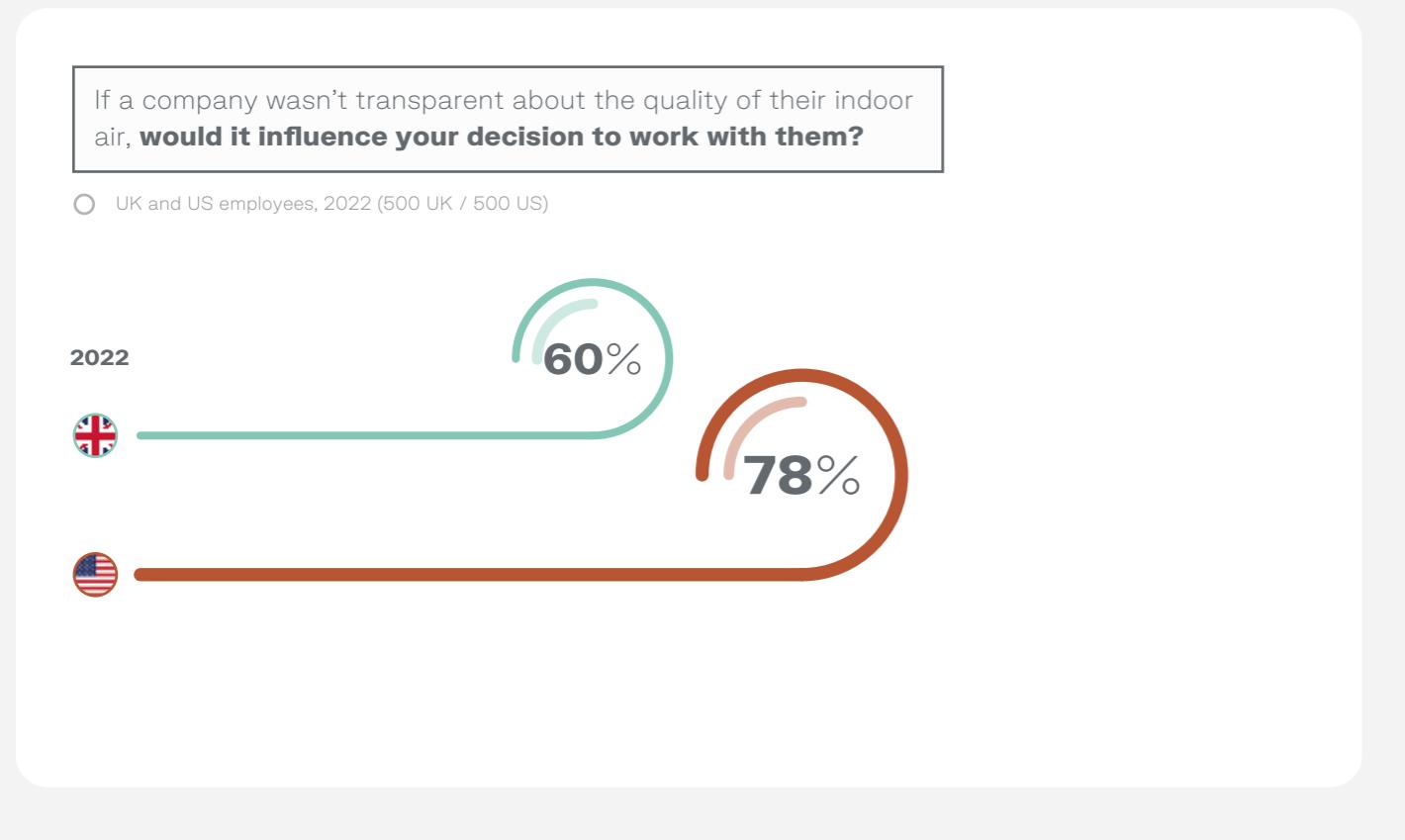
Healthy buildings benefit everyone who uses them, so we felt it important to try and understand the importance that the core users of a commercial building or office, employees, place on indoor air quality.

The following results highlight the main themes of our survey when it comes to the expectations employees have for the health of their workplace, highlighting the importance of monitoring, transparency, and governance in creating a healthy working environment.

81% of employees believe that IAQ monitoring should be mandatory for all office buildings



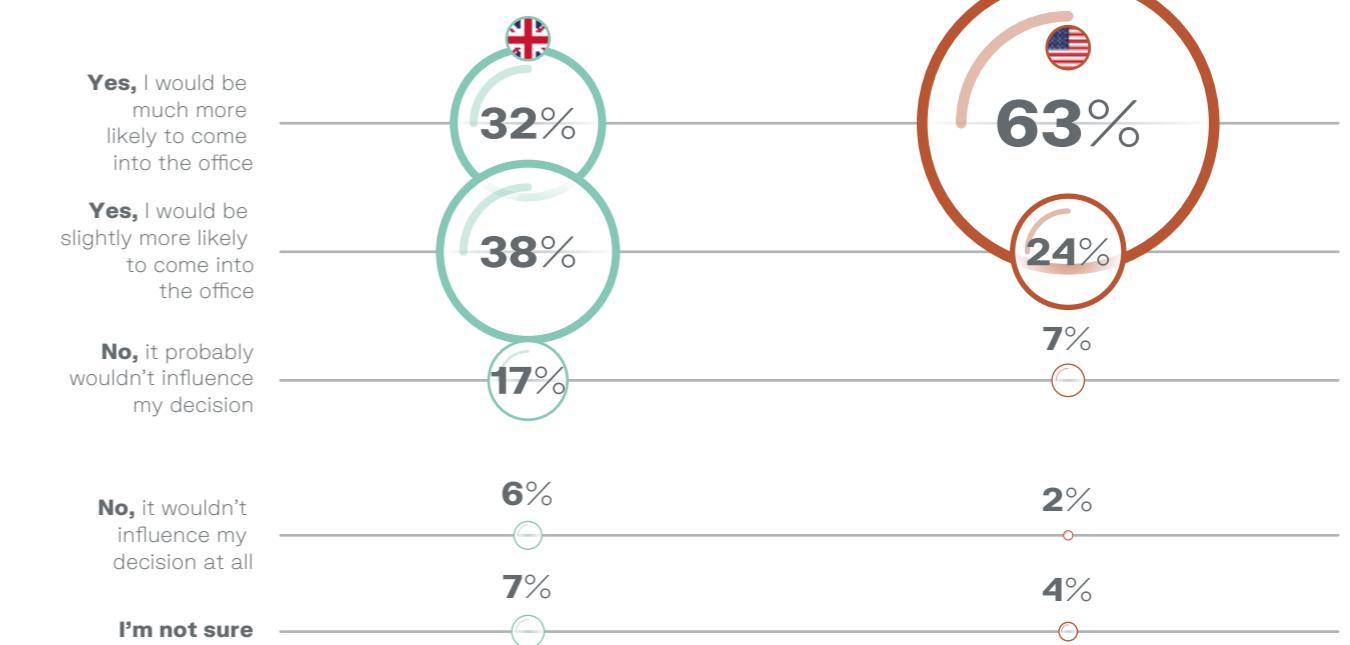
The majority of employees would be less likely to come to the office or even choose to work for an organisation if they weren't transparent about their indoor air quality.



"81% suggested that IAQ should be mandatory for office buildings, with 69% suggesting that lack of monitoring and transparency would influence their decision to work for a company or in a particular building."

If your company building had a healthy building certification, would it **influence your decision to come into the office?**

○ UK and US employees (500 UK / 500 US)



78% of employees said they would be more likely to come into the office if it had a healthy building certification.

With less than 1% of commercial buildings in the UK and US having a healthy building certification this is a major differentiator when it comes to attracting talent to a business vs other businesses and also attracting occupiers to your building as a landlord vs other commercial space.

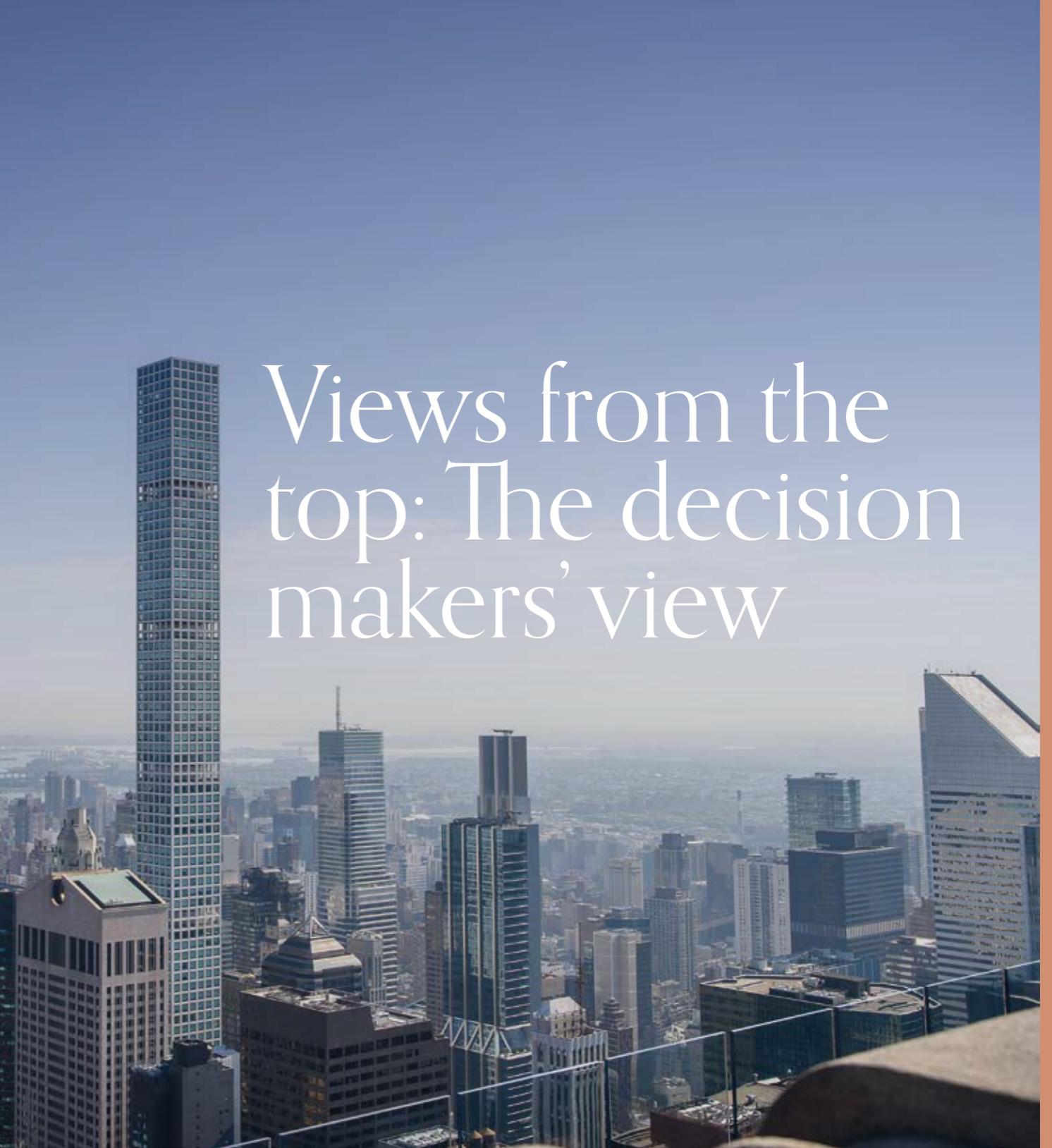
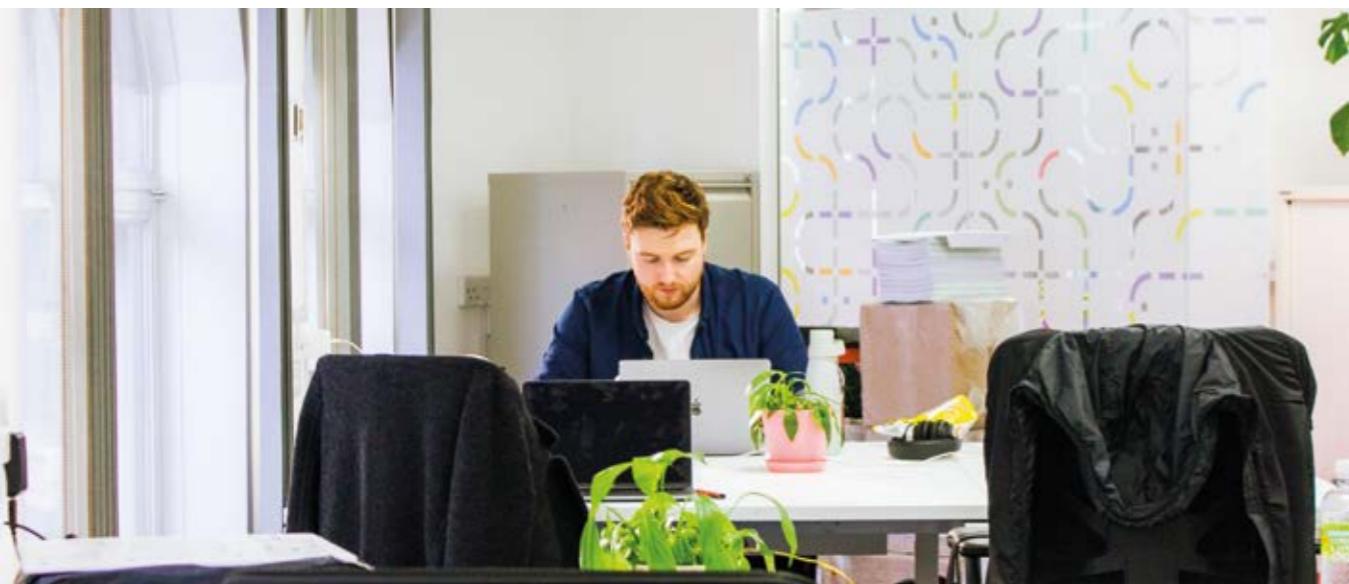
Employees in the US are much more likely to be put off organisations that aren't demonstrating a commitment to creating healthy indoor environments for them to work in.

The majority of US employees suggested that they'd be significantly less likely to work with an organisation that wasn't transparent about the indoor air quality of their office space, whilst 87% suggested that they'd be more likely to come to the office if it had a healthy building certification.

Employees predominantly lay the responsibility of ensuring good indoor air quality with business owners and decision makers as well as government and policy makers.

Who is most responsible for **ensuring good indoor air quality in commercial spaces?**

UK and US employees (500 UK / 500 US)

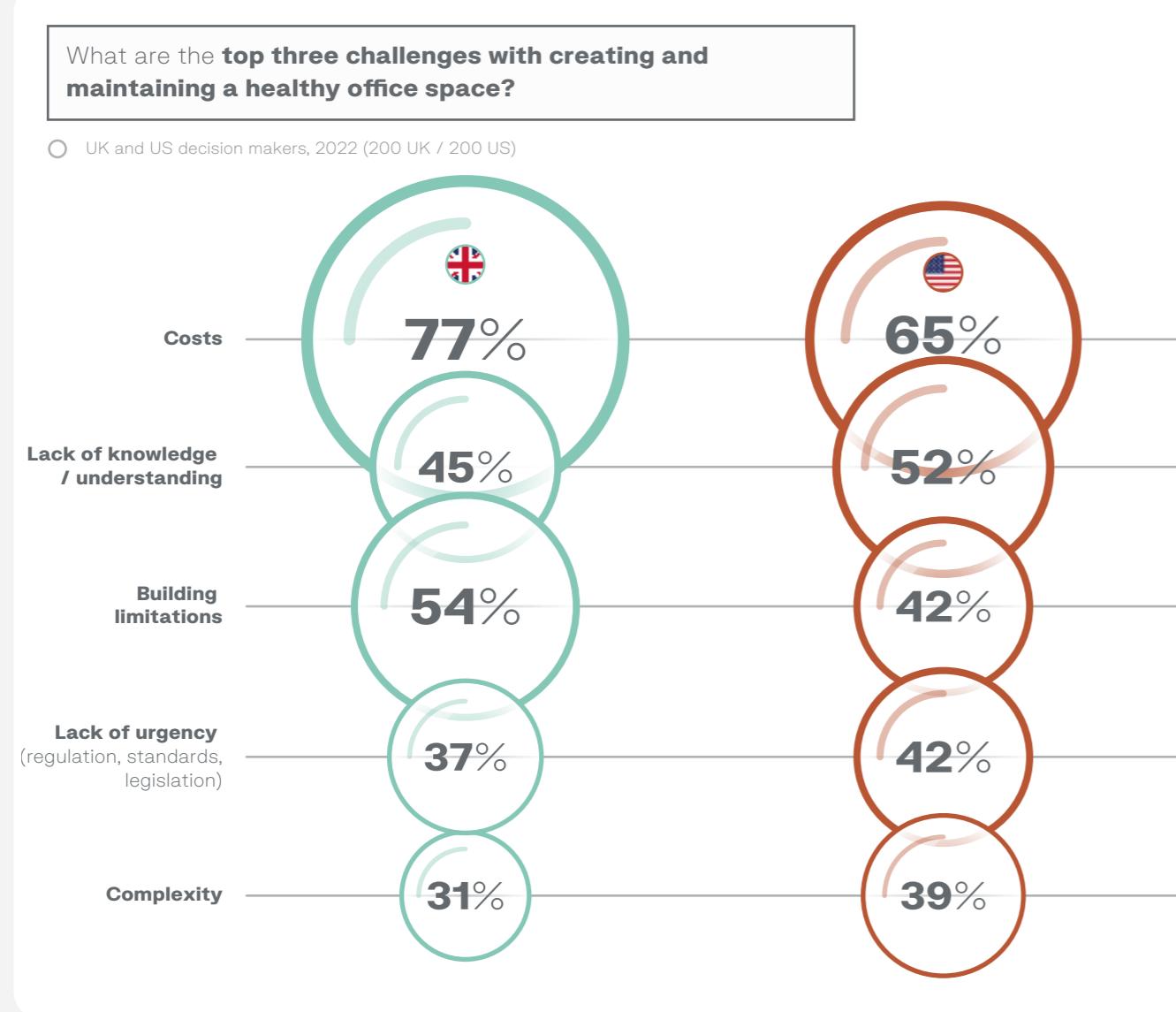


Views from the top: The decision makers' view

Now that we have a greater understanding of what the labour market is demanding from their working environment, what are decision makers currently thinking about?

This year's survey sought to identify how decision makers approach the development or selection of commercial space, what the challenges are in creating a healthy working environment, whether they value healthy buildings and who they turn to for guidance or advice.

Cost is listed as the main challenge for decision makers by a significant amount. Does this indicate that they put profit over health? Or is it that they aren't convinced of the return on investment that healthy buildings can bring?



As cost is listed as the main challenge for decision makers, does this indicate that they put profit over health or aren't convinced of the return on investment that healthy buildings can bring?

With around half of decision-makers suggesting that they lack knowledge and understanding it could be that this – paired with pressures to manage costs and budgets when sourcing commercial space or developing/retrofitting a

building – leads to hesitancy to commit to creating truly healthy spaces.

There was also a relatively even split across the lack of regulations and the complexity of some projects, suggesting there's clearly a need to address a number of perceived barriers to healthy buildings for them to become more commonplace.



Businesses and occupiers are looking to industry specialists to help them overcome the challenges of creating and maintaining healthy buildings.

Where would you go for support to create and maintain a healthy office space as an **occupier**?

UK and US decision makers, 2022 (200 UK / 200 US)

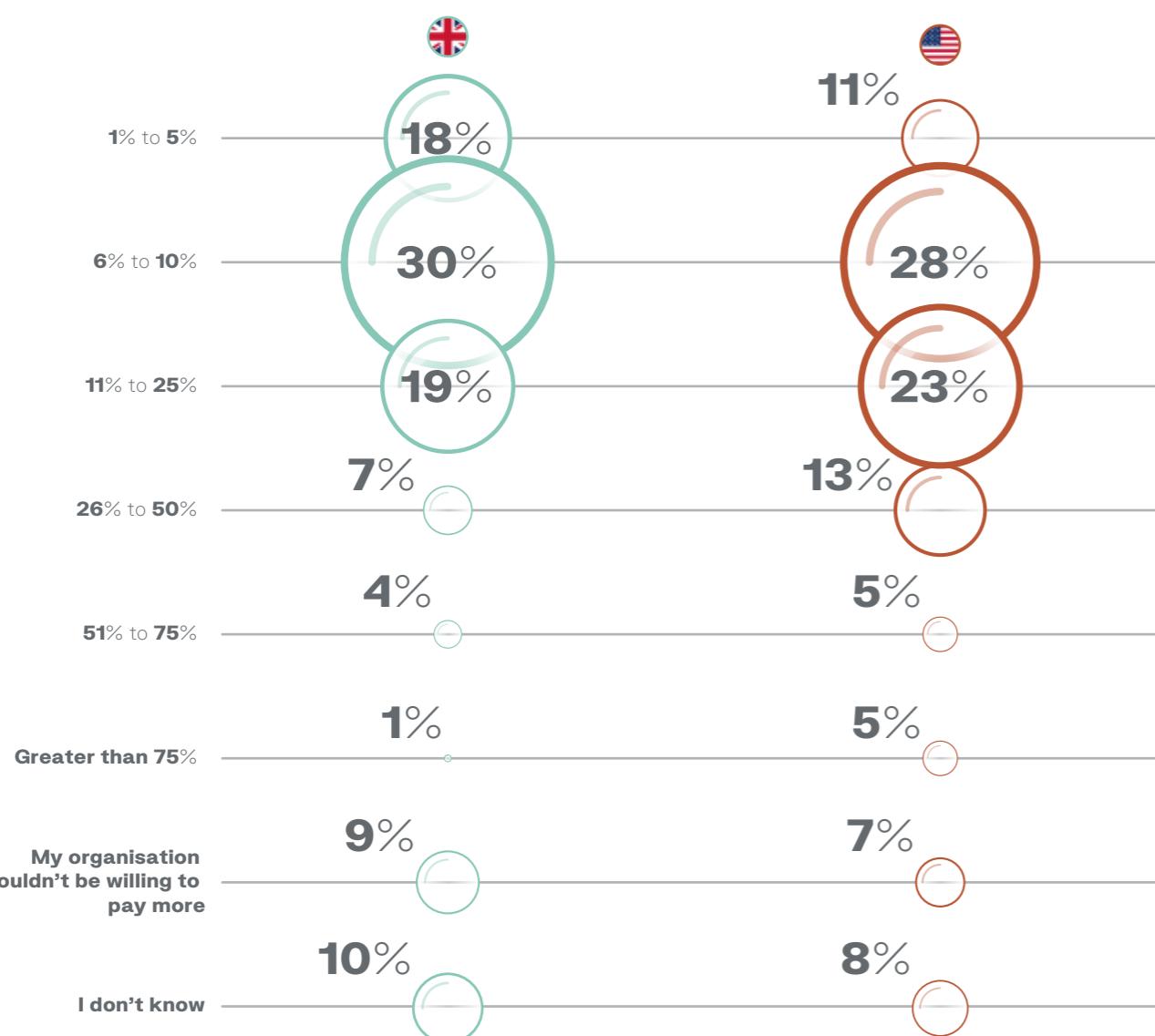


Whilst certification bodies are the go-to for help and support, on-site property managers are going to be under pressure to ensure buildings stay healthy, otherwise they could have disgruntled occupiers knocking at their door.

Businesses are willing to pay an 18% premium for commercial space that has a healthy building certification.

How much more would you be willing to pay for a commercial space that had healthy building certifications?

● Overall mean percentage increase 2022



81% of UK businesses and 85% of US businesses surveyed say they would pay a premium on commercial space with a building certification, with only 8% of occupiers on average not willing to pay a premium.

This could suggest that decision makers are looking pass the cost burden of creating or maintaining a healthy workplace onto the landlord.

When this is paired with the fact that 78% of employees would be more likely to go to the office if it had a healthy building certification this is good news for landlords who are looking to increase rates and occupancy across their portfolio.

Tension in the air: Where employees and decision makers don't agree



What about when there's misalignment between employees and those making the decisions on the commercial space they use?

We've already seen that there's some misalignment when it comes to what employees and decision makers prioritise regarding working environments (see page 22/23), and there are some other worrying trends that could lead to both employees and businesses being negatively impacted in the long run.

"In the UK, businesses underestimate increased awareness by 12%, with the gap bigger in the US at 14%. With businesses underestimating the level of growing awareness in the market, this could lead to issues with retention, absenteeism and performance"



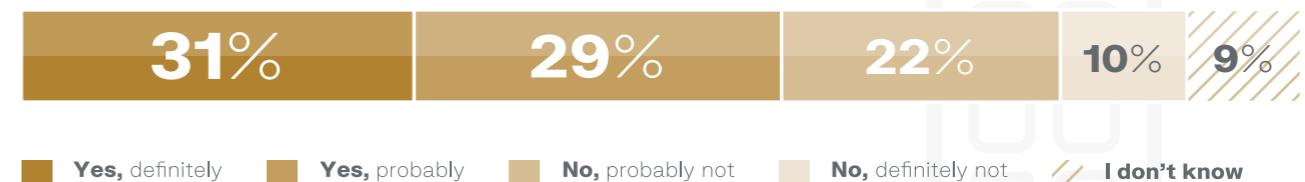
Businesses underestimate the growing awareness of IAQ across their employees.

Business decision makers

Are employees at your business **becoming more aware of indoor air quality or asking more questions in relation to your office?**

UK and US overall averages, 2022 (400 respondents)

Decision makers



■ Yes, definitely ■ Yes, probably ■ No, probably not ■ No, definitely not ■ I don't know

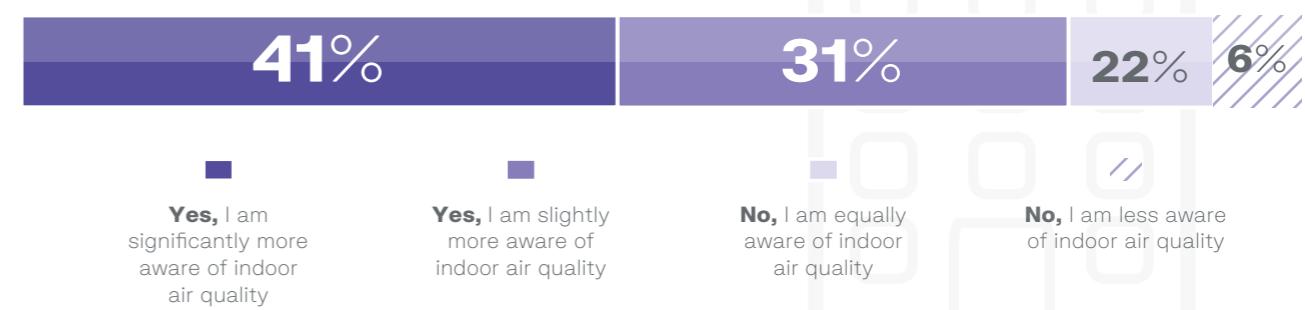
VS

Employees

Has your level of awareness of IAQ increased in the last year?

Combined UK and US overall averages, 2022 (1,400 respondents)

Employees & decision makers



In the UK, businesses underestimate increased awareness by 12%, with the gap bigger in the US at 14%. With businesses underestimating the level of growing awareness in the market, this could lead to issues with retention, absenteeism and performance.

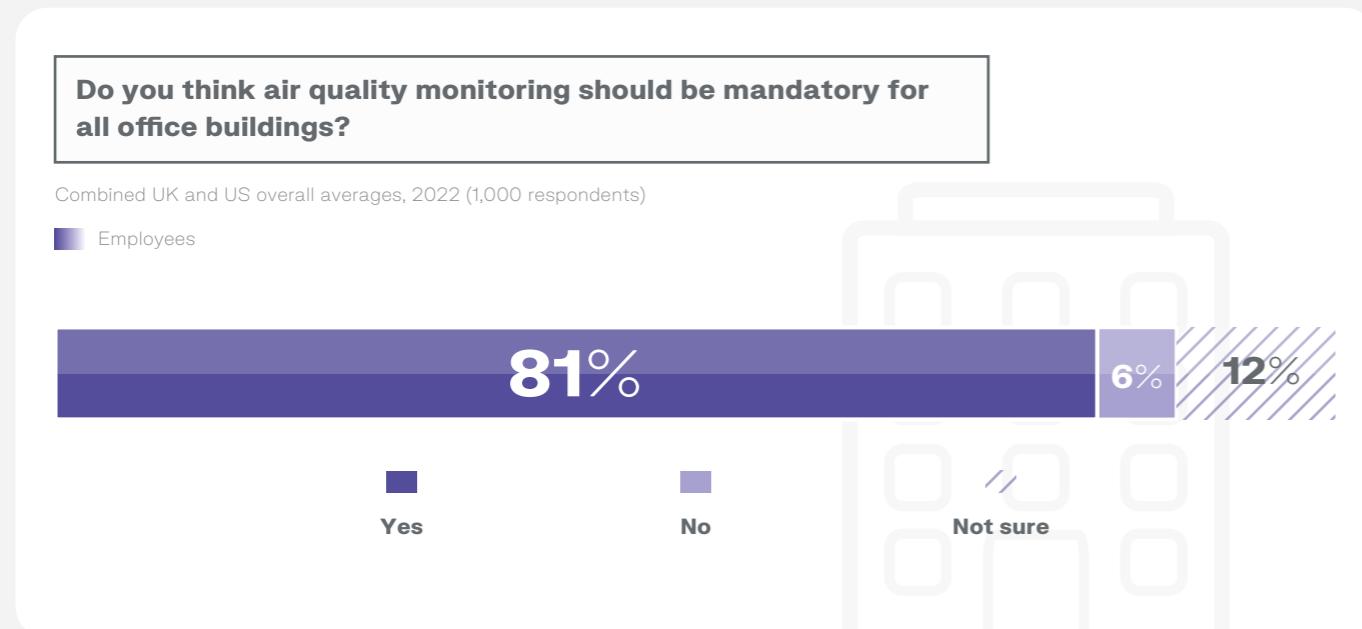
It could also impact the priority they place on healthy buildings going forward and could leave them behind other organisations who have a greater awareness of the tendencies of their workforce.

Only a quarter of businesses are committed to IAQ monitoring even though 81% of employees believe it should be mandatory.

Business decision makers



Employees



If a company wasn't transparent about the quality of their indoor air, **would it influence your decision to work with them?**

UK and US overall averages, 2022 (1,400 respondents)

Employees & decision makers

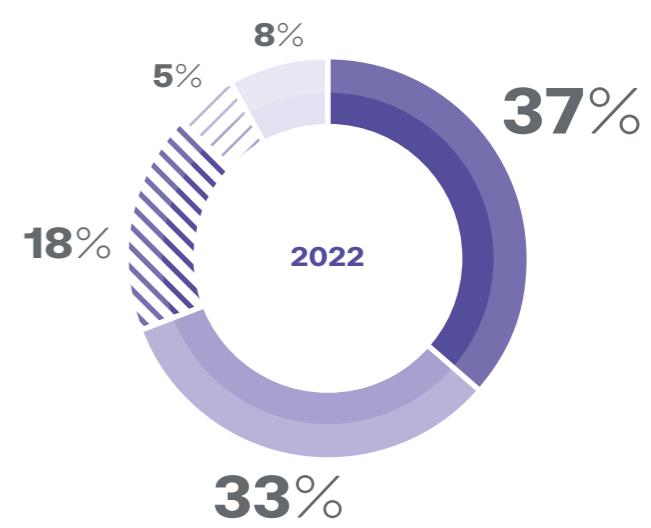
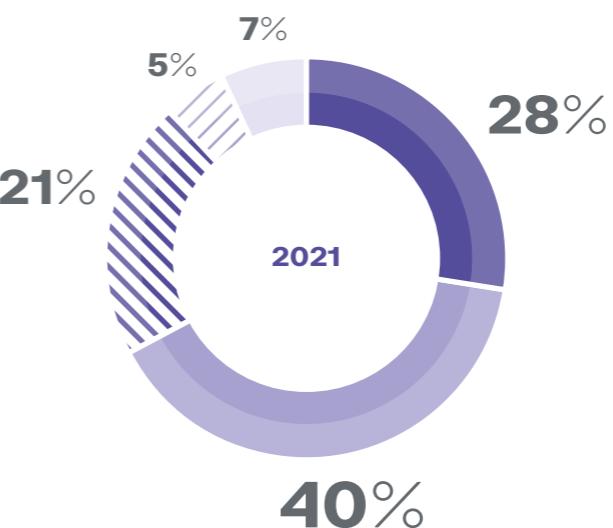
Yes, I would be much less likely to work with them

Yes, I would be slightly less likely to work with them

No, it wouldn't really influence my decision

No, it wouldn't influence my decision at all

I'm not sure

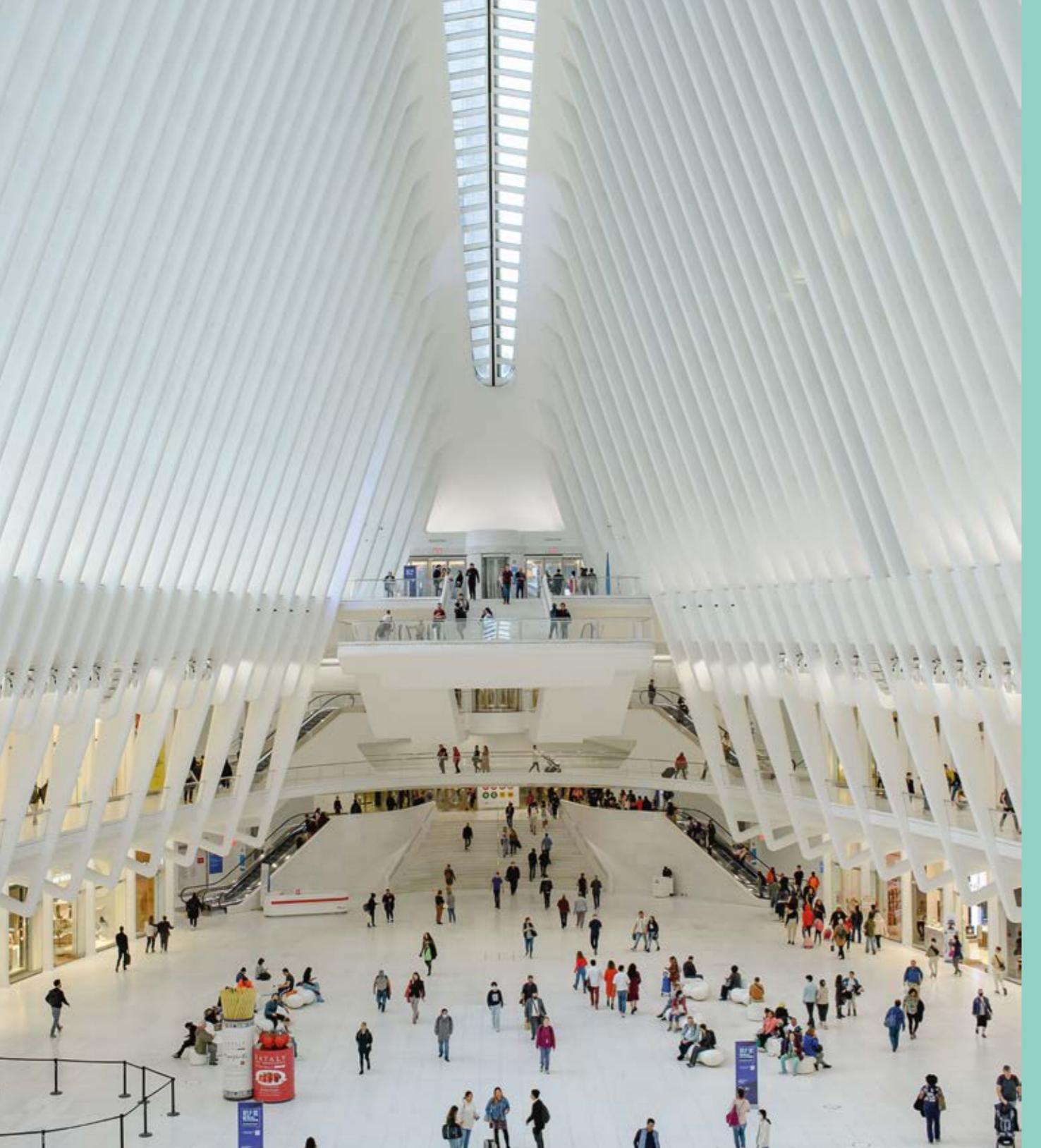


As well as underestimating the growing awareness of IAQ among employees, 27% of businesses don't even have any considerations for IAQ monitoring, despite regulations and guidance in the form of Part F regulations in the UK and EPA best practice guidance.

With 80% of employees stating that they think IAQ monitoring should be mandatory and 69% saying that lack of transparency would negatively influence their decision to work for an organisation, this could impact a businesses recruitment, retention and happiness of staff.

Over half of the businesses we surveyed were either committing to or considering monitoring IAQ within the next 12 months – the 50% of businesses with no plans could be losing out to organisations that have plans or are already actively monitoring their space.





Summary and key takeaways

For building occupiers

Healthy workplaces are a top consideration for your staff and prospective employees

When it comes to the workplace, the health of your space is growing in importance among employees. As a top two feature for both UK and US employees alongside location, ensuring that you have a healthy indoor environment should be a priority when choosing, developing or fitting out a commercial space.

It might also be worth considering the outdoor air quality of your location and how that could impact the health of your indoor environment, it could also lead to increased costs in implementing more advanced HVAC equipment.

Data is the new oil – make sure you understand how your space operates

Transparency around the health of a space is becoming a key factor in employees' willingness to work in a space or even certain companies.

81% of employees believe that IAQ monitoring should be made compulsory, however only a quarter of organisations have a firm commitment in adopting IAQ monitoring, suggesting that there's a disconnect in the supply and demand of health data within indoor environments.

Conducting IAQ monitoring and sharing that data openly with staff could help you communicate your commitment to employee health and wellbeing, improve office attendance and absenteeism as well as staff retention and recruitment when comparing against the approaches of the average organisation.

Employees hold you accountable for the creating and maintaining of a healthy building

When employees were asked who they thought was most responsible for the health of a working environment, business owners and decision makers were comfortably top of the list. Whilst there are clearly calls for government and public decision makers to set new standards (they ranked second in both the UK and US), employees are looking to senior management in their organisations to prioritise healthy buildings and lead the charge.

With this in mind, it's important that you are clearly communicating your plans and activities internally amongst your team to ensure buy-in and transparency around maintaining good indoor air quality in your office space.

Look for a commercial space with healthy building certifications, or consider investing in certifications yourself

Cost is one of the main barriers to organisations creating and maintaining a healthy indoor environment. Even though there can be a question as to whether cost is a reasonable challenge in the eyes of employees, one of the ways around that would be to prioritise finding commercial spaces with existing building certifications or partnering with a landlord who's committed to creating and maintaining healthy workplaces with you.

Not only could this help you attract more of your staff back to the office (78% of employees said a healthy building certification would positively influence them in returning to or using the office) but it can save you the capex costs associated with developing or retrofitting your own space to improve indoor air quality.

Alternatively, if you are looking to develop a space, investing in design certifications such as AirRated's AirScore D&O can help you make smarter, more cost-effective design decisions earlier in the design process to prioritise the health of your commercial space and ensure your specification will deliver a safe, comfortable and productive working environment.



For landlords and developers

Healthy buildings can lead to better rental returns

With occupiers open to paying an average premium of 18% for commercial space with a healthy building certification associated with the building and stating that cost is their greatest barrier to creating and maintaining a space, there's an opportunity to increase your leasing returns and also improve your occupancy rate.

If you take average office data from the UK (courtesy of LSH), a new build 10,000 sq ft. office would rent at around £89 per sq ft. per year, totalling £890,000 per year. At an 18% premium this would be an additional £160,200 in rent per year.

If you looked at getting an AirScore™ for your 10,000 sq ft. property this would come to £3,300, meaning that the additional 18% in rent would equate to a payback period of just over 1 week (7.5 days) and an ROI of £48 for every £1 spent on certification.

Research by Franz Fuerst of the University of Cambridge looked at real life data of rental increases post-certification in the US and found this to be 5%. Even if this was the case, the

average rental increase for a 10,000 sq ft. office in the UK would still be £44,500 per year. With less than 1% of commercial buildings being certified as a healthy building, the data suggests that certification offers a significant differentiator for workplaces that ultimately supports the bottom line.

Design with health in mind: Occupiers and employees have a high demand for healthy buildings alongside location

When asked what features of a workplace they care about the most, employees and decision makers both said the health of the indoor environment alongside location. These were both prioritised above amenities, connectivity and sustainability across the majority of respondents, highlighting the importance of designing and creating workplaces that benefit the health of its occupants.

Occupiers are clearly feeling the push from employees to provide them with optimum indoor environments to not only keep them safe but to also help them be more productive in their work. As a landlord if you're able to provide healthy buildings, in a good location and at a competitive price you'll be solving a lot of the challenges occupiers have in sourcing commercial spaces while catering to the demands of their workforce too. It's a win win.

For employees

Your organisation underestimates your awareness and understanding of IAQ

Whilst organisations are aware of the growing awareness and understanding of indoor air quality amongst employees, they most likely underestimate how important it is to their employees.

On average organisations underestimated awareness by 13% and only 60% of organisations are either currently monitoring IAQ or planning to monitor IAQ in the next 12 months despite 80% of employees believing that it should be mandatory in commercial buildings.

Keep pushing for transparency about your indoor working environment

With lots of organisations struggling to engage employees to come back to the office it's important that you are clear on what is important to you. You

can show them this report and encourage them to look into ways in which they can provide the best possible working environment: we've made lots of suggestions and it's clear that there are real benefits for all stakeholders in creating healthy, safe and productive commercial spaces.

Like many others are doing you can get your own air quality sensor and collect some data so that you can validate your concerns about your workplace, most sensors will alert you when certain parameters are at concerning levels and you can also compare them to WHO air quality guidelines too. Even better you could look into conducting an AirRated™ study of your office space.

Ultimately you should have the confidence to be able to go back to your organisation and encourage them to take healthy buildings and indoor air quality seriously as we all have the right to breathe clean air.

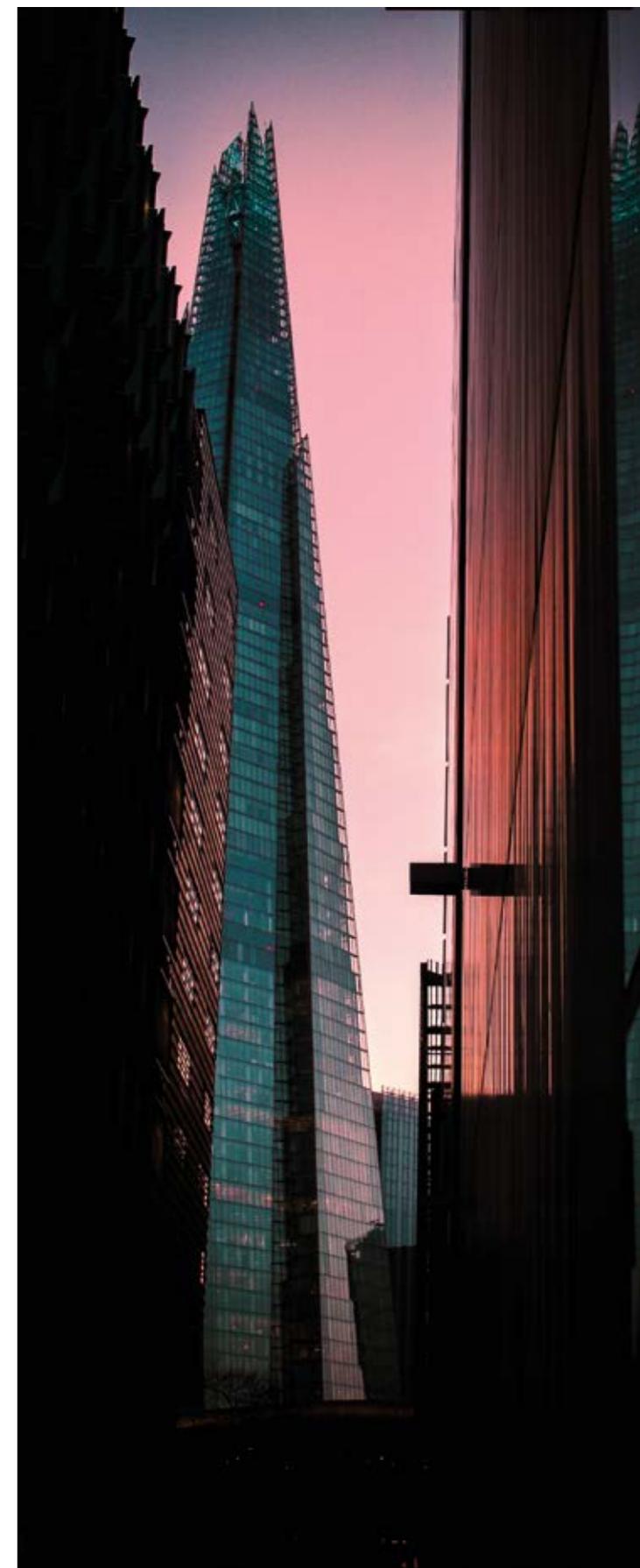
For employees & organisations

We're all in this together

With the discrepancies between the demands of employees and the current or planned actions of an organisation, it's important that employees not only make their stance clear but also that organisations take the time to listen to employees and better understand what's important to them when it comes to their workplace.

Ultimately both sides of the conversation need to be engaged to create positive change. If you have a sustainability or wellbeing committee or even a forum to bring these issues to light, make sure you champion your indoor environment and give it the attention it deserves.

“Occupiers are clearly feeling the push from employees to provide them with optimum indoor environments to not only keep them safe but to also help them be more productive in their work.”



How healthy is your workplace?

AirRated™ provide certifications for Indoor Air Quality (IAQ). Using the leading sensor technology, we collect detailed information about your IAQ, then grade it based on leading medical research and industry best practice. This process determines your building's AirScore™.

The core parameters



Simple and easy to understand, our certifications are measured against our five core parameters, **TVOCs, PM2.5, CO₂, humidity and temperature**. All of which determine the health of an indoor environment.

Our certifications

Our accessible certifications translate both building and air quality data into an easy to understand score that you can communicate to your stakeholders.

Design

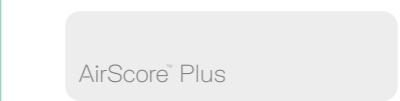


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Acknowledgements

And finally

We'd like to say a huge thank you to all our writers, designers and research team for their generosity – both with their time and their words.

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Get in touch If you have any feedback or questions about this report or indoor air quality in general, we'd love to hear from you.

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