

The Weekly Take

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The Air That I Breathe: The Case for Healthy Buildings

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Spencer Levy

I'm Spencer Levy, and this is The Weekly Take. The air time we spend together is usually filled with talk of buildings and the business of commercial real estate. What we don't often get into is the topic of the actual air itself. On this episode, a team from Harvard University on the relatively novel idea that there is business value in real estate that's literally good for the people inside. In fact, they wrote the book on it. Healthy Buildings: How Indoor Spaces Drive Performance and Productivity.

Joe Allen

What we think has been missing from this conversation from a long time in the business world is just how important buildings are to your employees and the bottom line of your company.

Spencer Levy

That's Joe Allen, one of those coauthors who's also the director of the Healthy Buildings Program and an assistant professor at Harvard's T.H. Chan School of Public Health.

John Macomber

We think this will be more and more important, even post-COVID, as people think about what else is in the outdoor air? What else is in indoor air? And how does that apply for us?

Spencer Levy

And that's coauthor John Macomber, a Senior Lecturer in finance at Harvard Business School, who's also done more than 30 case studies on infrastructure projects and office buildings. John brings three decades of practical experience in real estate and the construction business to his work as a writer and educator. We'll study up on *Healthy Buildings*, a book that was hailed as one of 2020's best by *Fortune Magazine* and the American Institute of Architecture. We'll talk about the science and the business of sustainability and wellness, the effect of temperature, and filtration and more from the power of aromas like roses and cinnamon buns to the return on investment for something as simple as fresh air. Coming up: the case for healthy buildings. That's right now on *The Weekly Take*. Welcome to *The Weekly Take*, and this week we're going to talk about healthy buildings with two terrific guests from Harvard University. So you gentlemen wrote a terrific book, *Healthy Buildings*, which I'll tell you what, man, this is Wellness 101 as far as I'm concerned, and I've been in the real estate business for 30 years. But rather than my very brief description, Spencer Levy, why don't we start with you? Tell us what's in the book.

Spencer Levy

Well, I like how you described it as health and wellness 101. We wrote this book to be accessible to everybody. You don't have to be an expert in public health or in real estate finance to really get the main message across here. And I see the main message as this: Building performance drives human performance, drives business performance. They're all linked. And what we think has been missing from this conversation from a long time in the business world is just how important buildings are to your employees and the bottom line of your company. So really, that's the simple message. We bring in the science in a way we think is really accessible. It's not a science book. It's not a textbook by any means. But we populated the book with real examples from the research literature to show that this isn't hand-wavy, right? This is real science. This is real finance. And it makes a lot of sense. I also think that probably explains why John and I were a natural pair to write the book. I come the public health side and John's from the business school.

John Macomber

So this is a pre-COVID book. And part of what attracted me to Spencer Levy's work was the work he did on the cognitive function study, which was an empirical study of cognition basically under different conditions of air quality, notably carbon dioxide particulates, volatile organic compounds. So we were looking at that in the present time and the future time, how we thought that people's interest in healthy buildings would evolve. We often talk about the before times, before COVID during time, return to the office and then after COVID. So a lot of the initial message of the book for me is we're kind of gone overboard on the energy thing in the green buildings thing and been building sick buildings for 20 or 30 years. Or somebody somewhere in the organization is getting a pat on the back for saving two cents on electricity by not running the fans, not running the is not bringing in fresh air. On the other side, somebody in the organization is losing dollars, tens and twenties and hundreds at a time from people not really doing their best. So that was sort of the before times idea. If you think of going forward with people's increasing interest in air quality, not just from COVID, from particulates and fires and all this, we think this will be more and more important, even post-COVID, as people think about what else is in the outdoor air, what else is in indoor air and how does that apply for us, of course, in universities and government, but also in commercial real estate.

Spencer Levy

Well, let me read the full title of the book, because that's what has my favorite word in it. It says Healthy Buildings, How Indoor Spaces Drive Performance and Productivity. And productivity is my favorite word because it is the most misunderstood word, but it is the holy grail of business decisions. Joe, when I was fascinated about the book, was that you put some real numbers behind that because you were suggesting things such as temperature changes, different gases or lack of certain gases -- CO2, is one of them -- in the workplace, increases your cognition. Increases your productivity. Tell us a little bit more about that.

Joe Allen

Yeah, that's right. It's really a simple study that was sophisticated in design and all the control strategies. But at its core, we basically have a bunch of knowledge workers in an office space and we change the air they were breathing in subtle ways each day. And at the end of the day, we give them an hour and a half long cognitive function battery. And we're testing cognitive function domains that are clearly linked to better performance and productivity. Things like how does air quality influence your strategic decision making performance? How does it influence how you seek out and utilize information? How does it influence your performance during a crisis? How you respond and importantly, how do you recover from that crisis. And the study test? Did how simple changes to indoor air influences those parameters? These are not studies of some wild, extreme, unattainable, super healthy indoor environment. It's pretty much what every building to do right now, bringing a little bit more outdoor air use products that emit less of these chemicals, lower the CO2 concentration, and sure enough, people think more clearly. And let me just say this. That's the first study we did in this series. We called the og Effects study. We're now in our third series. We just completed and published our Global Cog Effects study, similar design. But we followed office workers around the world for an entire year over 300 workers, and we tested them multiple times at their desk, simultaneously measuring air quality at their desks and cognitive function. Well, it turns out we see the benefit. Every time you improve the ventilation rate, there's no threshold, there's no magical cutoff. So it tells us, importantly, that even the good buildings have room to improve.

Spencer Levy

So if I were to sum it up, if we do many of the things you're suggesting in your book, healthy buildings make you money. They may cost a little bit to install, but they actually end up making you a lot more. So John, now put on your construction hat. Walk me through how you, Mr. Builder, see the return on investment from healthy buildings.

John Macomber

Part of what we use in our financial model is essentially a zone of possible agreement. We did some math saying, OK, here's a typical tenant, might be a law firm or an accounting firm or something like that. They have 40 employees, and usually for a firm like that, their payroll is about half of their income statement and their rent might be 20 or 30 percent

of their income statement and their utilities, if it's a pass through like a net lease, are four or five percent. So if you think about trying to save energy on the tenant side, here we are trying to save five percent at five percent, that's peanuts. If the kind of research that Spencer Levy has found shows that people can indeed be a standard deviation clearer in their thinking, that potentially goes to the top line, the total holy grail. If that tenant, if their people can do two more reports, make a few more calls, do a couple more claims processes and analyze three or four or business plans, that's even better than avoiding sickout. It's real revenue to them. So if the tenant gets to keep all the revenue that costs their bottom line in our math, it increases their net income by about 10 percent. Looking at a one or two percent improvement in their output because of the healthy building and about a half a percent decrease in sick outs and all that, which is the normal stuff you've heard about before. And the energy savings are peanuts. That's the zone of possible agreement. So if the tenant says I'm only going to go to a building where the landlord has made it possible for me to have that kind of ventilation, the HEPA kind of filters, fresh air, those kind of things. Then there's a zone of agreement where you can talk between the employees, the tenant and the landlord about who actually gets that saving. The art for the landlords we're talking to is to say, you know, we have a building that's demonstrably healthier -- fresh air, a windows noise, all that kind of stuff. And we have smart tenant organizations who can measure this kind of thing. And they believe it, and they're going to pay us a premium. So that premium comes through that justifies it for the landlord to do. The cap-ex testified for the tenants of the op-ex in the zone of possible agreement is around who gets the benefit of that extra productivity?

Spencer Levy

Well, one of the case studies you used in the book is about 425 Park Avenue with David Levinson, who I would note with some pride was one of my first clients when I was a young banker with him and Rob Lapidus, many, many moons before at 425 Park. But I thought David had some very interesting quotes in the book. And one of the things he says, Look in up markets, we'll get more rent. In down markets, we'll get the tenant. You agree with that, John?

John Macomber

Well, of course, there's a natural experiment going on in New York City right now to see if this is going to be true. And Rob and David have formed L&L Holdings, which is the developer of 425 Park Avenue, claimed to be the healthiest building in New York, maybe the healthiest building in the world. So this got all my attention, and the case study we wrote looks at how much more cap-ex did these guys spend to make the building healthier and how much more op-ex that's a landlord have to spend on a regular basis, recertifying this with Well, or Fitwell or whatever system it is and keeping the systems in place. So you toggle that and look at that difference. The cap-ex difference is like three or four percent because it's just in the U.S.. How much more rent do you have to get? That's the interesting thing is how much more rent you have to believe. So in an upmarket when you have the total premium kind of clients who are looking for every reason to attract staff and have the staff working well, yeah, it's clear that they will pay a premium for that kind of space. Now you're seeing almost everywhere that the sick buildings aren't as appealing. There aren't that many trades now, but if you think about trying to move a 60-story fixed window under-ventilated small elevator building in Manhattan as compared to one that it's more modern operable windows, more like big elevators and big business system, they're clearly more valuable already. Or how many emails do you get every day from these hotel chains saying, Come to our hotel, not that hotel, because our hotel is cleaner. So it's clearly thought to be an advantage in terms of market share and

occupancy, even if it's not in there right in the coupon. So I agree with what David Levinson said that in the up markets we'll get the premium, down market we'll get the tenant.

Spencer Levy

Well, the reason why I choose my hotels is I've been fortunate to go to Hawaii a couple of times and when you walk in, they have that pumped-in smell of roses and flowers. And I was like, Wow, I feel better. But then I read your book and I'm like, My God, are they poisoning me? And then I walked by Cinnabon. I'm like, My God, I knew it was going to kill me if I ate it. But now I've got this smell coming into my face.

John Macomber

Let me give you a different sample, Spencer. You've probably never been there. But like if you had any casino in Las Vegas to Caesars or MGM, they pump in fresh air all the time because they want the gamblers alert. Some of the best indoor air you can get. And they've known this for a long time. You can't find the exit. It's like a crab trap or lobster trap, but they've been pumping in fresh air a lot. It's different than the scented air you might get for the Hawaii vibe. But the casinos and knowing how to keep people alert. Same thing in a hospital operating room where they want to reduce infection and they want to keep the surgeons alert. So it's all HEPA filters that's been known and it's known anecdotally. You know, if you're in a stuffy conference room, you feel logy. Part of what Joe's research has shown beyond anecdotal is really there's empirical evidence around how people really do perform better.

Joe Allen

You know, I was going to tie that in, you know, pre-COVID, I was out at the Burj Khalifa touring around and it turns out -- I don't know if you know this -- but on each floor they have a different smell or a different scent. And so it ties right into this. But I tell you clearly what the science is saying, right? And what people are looking for now is what does the real science say? I want clean and healthy air. People are getting a lot more sophisticated. It's not just I want this Florida smell like lavender or vanilla or something like this to mask sometimes something else. But how do we just get basic clean air? And speaking of 425 Park Avenue, it is raising an important question that John talks about a lot, which is this split incentives or who controls what? That's a core and shell buildout. So they've designed it with some healthy building attributes. I think it remains to be seen what the tenants of that building are going to do with their fit-outs. I've seen this many times of buildings: beautiful building, one of these healthy building attributes tenant comes in. Maybe they're not going to spend. Maybe don't believe this argument that a couple of percent cap-ex is going to lead to these big gains. And then you create a less than ideal indoor space in what is a healthy building on the outside, but not a healthy building on the inside. We write about this honestly in the book, and we actually compare it to steroid use. And we have a little anecdote in the beginning there. Hey, you can look great on the outside, right? You build yourself up. Meanwhile, you're polluting yourself on the inside. We see a lot of buildings like this. There's important lessons there, and it gets into this conversation about who wins, who benefits. How do you find these areas of mutual agreement.

John Macomber

But how do you measure it? So we've written a lot about health performance indicators. So how do you get beyond just the hand-waving into what's actually happening? Who recognizes that? Who values the information?

Spencer Levy

Well, John, one of the interesting things you said early on in your comments was about this tension between green and healthy buildings. And I know in your book you try to make the case. They were symbiotic. They work together. But let's call it what it is. If you have operable windows, many people in the green world will say that's a bad thing because it lets the energy out. So in general terms, how does green work together with healthy buildings or where are they at conflict?

John Macomber

I'll answer one way, and Joe Allen might answer in a different way. But if you think about a time series of dozens of years, we didn't have healthy buildings issues until the 40s or 50s because the buildings were so leaky. You just build a leaky building and you blow energy out to get the humidity. We didn't have the mold and all that stuff because the building was blowing out the air all year long. So then we get into the healthy building era and in, I think, both my Joe Allen and my view overcompensated. So now you have a lot of buildings that were built really without thinking about ventilation and filtration. So the quick way to address that is open the stupid windows and run the fans, even if it does take some more energy. And it's really quite clear about the benefits -- particularly during COVID time -- of open the windows, have those indoor HEPA filters, they work, and that kind of thing. And part of the premise in the book is, yeah, it's not as green as it might have been, but we've gone too far in chasing energy and the actual humans are not doing well. Now, I think going forward, almost any kind of high-performance building that gets closer to a passive house kind of standard has a very good insulation system, very little air leakage in and out. And so then it's possible to not have to condition outside air all the time. You can reuse the inside air, don't have to heat it, cool it or dehumidify it. But you can spend more to filter it. So buildings going forward are already finding that this is cost effective to spend a little bit more on the envelope than you don't have to bring in 100 degree air cooling down to 60. Drop all air to heat it back up to 70, put it in the building or bring in outside air at 30 degrees Fahrenheit. Heat it up and run it through the building. So really, the savings that you get in most climates from having a building that is efficient like that more than offset running the offense and filters if you're not conditioning a boatload of outside air on a regular basis.

Spencer Levy

Well, let me just for the sake of discussion, take a little bit of the devil's advocate side here, and I would just say running the building 24-7. It sounds like blasphemy from an energy standpoint. Keep the building running, keep the energy on, but it's healthier and you're better for it. Joe Allen, how do you respond?

Joe Allen

We have to have both. We have to have energy efficiency and healthy indoor environments. And I think this is the crux of the problem -- is that we've been presented with this false choice for 40 years. It's energy or health. It's that false tradeoff. So how do we do both and do better? But we have a whole chapter in the book that talks about it. But really, let's think about this from a systems-level approach. First and foremost, we have to get a cleaner energy grid. Second, we need to address fossil fuel combustion inside of our buildings. My team published a paper just a couple of months ago showing that the clean energy transition that's happening the U.S. for the past 10 years, as we've migrated away from coal, the dominant health impacts that are coming from fossil fuel combustion are no longer from the central plants. They are from buildings. Buildings are getting a whole lot more attention right now in the coming years because of onsite fossil fuel combustion. So let's clean the grid. Let's get rid of those fossil fuels onsite combustion of fossil fuels. Last, let's start to get smarter about our ventilation systems. Clearly, we need more energy-efficient systems. We can also use things like energy recovery, ventilation, heat recovery ventilation. And let's merge the smart building and healthy building movements. Let's stop dumping air into our buildings 24-7 in rooms where there aren't people. So we use things like demand control ventilation to pump air when and where it's needed, and more importantly, pump in sufficient air. Let's not choke off the air supply in our buildings at the expense of people's health to serve a little bit of energy when if we take this holistic approach, we can actually do a lot more for climate and reduce the immediate impact health burden of air pollutants emitted from fossil fuel combustion. So really, I think this conversation often gets really siloed and narrowed. Without taking this big picture approach, we can have both. We can't have energy efficiency and healthy indoor air, and anyone who presents it not in that manner is presenting us with a false choice. And we've had that for 40 years. And quite honestly, you can hear my voice. I'm tired of it.

John Macomber

I think I would comment also that when people analyze that energy use and the indoor health with recommissioning of building, it might be 10 years old. You know, in addition to maybe being some leaky windows, nobody has refreshed the boiler. Nobody has thought about the air conditioning system. So most of the time, the things that you're talking about, Spencer Levy, in terms of the extra cost around that ventilation are actually more than saved. When people recommission and make their boiler run efficiently and make their air conditioning unit run efficiently and change the fans and the filters in the belts and all that stuff. There's a lot of money being left behind in core infrastructure in the building that is more wasteful than conditioning some more outside air.

Joe Allen

That's exactly right. We don't have to go out and buy brand new systems, but the simple act of commissioning, which is the process -- I see it as, you know, like you give your car a tune up every year. Well. All things need a tune up every year, and research from Lawrence Berkeley National Lab shows that when you commission your systems making sure the fans are operating, make sure the filters are installed correctly. You save energy. Say that's bottom line savings right into your company. You save that energy. It's good for the planet, too. And the process of commissioning improves overall indoor air quality. So it's a no brainer. What can I optimize going forward? The next time I have a capital upgrade, what do I need to put in place to give me both good indoor air quality and energy efficiency?

Spencer Levy

So let's talk about temperature for just a moment. When I read about emerging market economies, I've been told that one of the single biggest factors to make that economy more productive is just good, old fashioned air conditioning. Now, obviously, air conditioning is a high energy use. There are negative externalities of its emissions. But there's a recent move, I believe in Europe, where they're talking about, well, you know, we should raise our temperature in our offices by one degree centigrade to save some energy. And then I read your book. And if you raise your temperature by one degree centigrade, you lose something like one percent of cognitive ability. So Joe Allen, how do you respond to those people saying you should make your buildings one degree Centigrade warmer?

Joe Allen

For me, it sounds like one of these things that sounds great on paper, but is a totally unrealistic policy detached from human behavior and what's going on in the world, and also ignores the severe consequences of heat stress and also the benefits we talk about in the book in terms of cognitive function. Here's the thing. There's a couple of things again we can do in terms of keeping people comfortable inside buildings with regard to temperature and humidity that doesn't have to break the bank in terms of energy efficiency. First there's already been a move in the US and elsewhere to use refrigerants that have a lower greenhouse gas potential. So that's one. Two, again, if we're pulling from a green grid, then the energy demand or the electricity needed to run some of these air conditioners has essentially zero marginal cost from a perspective of environmental costs. So I support the electrify everything movement, right? We start electrifying our buildings, we reduce the demand on the grid, we reduce onsite fossil fuel combustion and we must get to a cleaner grid. And ~~when we're in that~~, when we get there will be in a much better place in our buildings if we start to electrify these. I also think we should move away from just air conditioning to the use of heat pumps as we electrify everything, get a cleaner grid. We should be using these tools that both provide heat and cooling and draw on electric energy. And hopefully, or what needs to happen, is that that's clean energy from the grid.

John Macomber

And to make a comment about where you said, Spencer Levy. You conflated two concepts. One is for now, people in like the fanciest city in the world. let's talk about one degree temperature in the office. The famous quote is about air conditioning making the economy possible, as Lee Kuan Yew, the founding president of Singapore, who thought that air conditioning made Singapore possible. And Singapore has been really thoughtful about how to do air conditioning going forward. The question really is for that in-between group of people who are living where it's more than a hundred degrees Fahrenheit and regular basis. So more than 40 degrees C. And there you have sort of a operating cost-capital cost kind of question. Because in broad strokes, it'd be good if people worked or lived in places that spent more money on capex in this case around insulation against heat year round, not against cold like you might have in Minnesota or in Norway, but against heat. And part of what Joe Allen and I are interested in is how you balance the extra upfront cost to avoid heat and other health issues with the savings down the road in bad health, basically. So you're trying to front load that expense by looking at the future benefit. Well, who gets the future benefit if somebody is healthier? Does it accrue to the employer? Or the state? The person? The tax guy? So you wind up with these funky kind of questions of tracking that down. But going forward, societies like Singapore have thought about it and made themselves rich over the last 50

years, they'll think of making those long term investments. What will happen in Mexico or Pakistan is another question. But the issue outside of listeners, who are commercial real estate people thinking about New York and Washington is a global one. If we're thinking about how people can perform their best.

Spencer Levy

Well, let's bring it back here to the U.S. for just a moment. And I think this is a global phenomenon, but maybe it's more acute here, which is the work from home movement where more people are not working in the office anymore. They're working in their houses. Joe or John, how does that impact the health and wellness of the air and other factors impacting employees?

Joe Allen

Well, I'll jump in. What we've been talking about here and we talk about in our book: our basic human physiology. The air quality in your home is going to. And you just like the office, just like on the airplane or the car. Of course, what's different in the home, at least for a lot of people prior to the pandemic, was that maybe your goals are different. You want good indoor air quality for a lot of reasons, but it also influences how well you sleep and how well you rest. Good indoor air quality is influencing mental health, not just cognitive function towards productivity. Now, add in this fundamental shift in how American society is working with a work from anywhere mentality of many people working at home and reconfiguring their homes in many cases. Well, indoor air quality matters a lot, but it's been an afterthought in how we design and construct our homes. I'll take my own office that I'm in right now. This is what used to be a kid's bedroom. It's now an office. I'm measuring carbon dioxide in my office. Right now, it's at 1500 parts per million. This is an under ventilated house. No question I have to pop open the windows. If we weren't on a podcast, I would do it right now. But it's making everybody rethink their homes. And that just wasn't the case before. Before I was interested in a house that was relaxing. Come home and have a glass of wine and want to sleep well, relax and have fun with the kids. But now it's a work environment. So a lot of this the principles, the fundamental principles we talked about in the book and the fundamental studies on what drives better performance in an office apply equally to the home office

Spencer Levy

The word you used was equal Joe about the air quality, and I'm going to use that and specifically in the context you used it in the book that the optimal temperature isn't the same for everybody and there are differences based upon men and women and other factors. How do you deal with that in an office environment -- that different people have different optimal temperatures?

Joe Allen

It's the thermostat wars, right? And this has been long known and not going to surprise any women listening that we've set thermal comfort standards in offices around men, men's comfort and men wearing three-piece suits. That's how old

these thermal comfort standards are, right? So is it no wonder that men and women disagree in terms of comfort levels with temperature in an office setting and add on top of that individual preference? So we've really got it backwards. I think what happens and this is just the same thing with the air quality conversation is we haven't prioritized this. People haven't thought it was important to health and well-being, right? It's been, Oh, you're a complainer. John's complaining. He's too hot. Joe's too cold. He's always complaining all the time. We kind of put the burden on the individual and not recognize that this is a health issue. We talk about thermal health in our book, not thermal comfort. Most of the industry uses the term thermal comfort. We talked about thermal health. It's actually a health issue, and we show how it links to bottom-line performance of the business, too. So if you're hearing employees saying I'm too hot, I'm too cold, the first thing a business owner should be thinking about, or executives should be thinking about is I'm losing productivity. This is time that people are spent distracted thinking about the air quality in the space -- in this case, temperature and humidity -- and it's having a big impact. Where I think buildings should be going here: We can be a lot smarter again. It's the merging of the smart building and healthy buildings, like I said earlier, where we can get to personalized indoor health. There's no reason we can't design and operate buildings to allow my office to be the temperature I want, John's office to be the temperature he want, everyone else to have their own controls, customize airflow demand, control ventilation. I mean, we just haven't prioritized health and how we're designing buildings. And fundamentally, I think that's where the problem is.

Spencer Levy

Well, one of the issues what you just said, Joe, is that that might have worked in that world where we all had offices. But certainly that the temperature wars may only get worse in a new modern off setting than it might have been in the past.

Joe Allen

I'll add one thing there. Think about underfloor ventilation, right where you can actually bring in the air right to each person's desk so you can actually have control even in an open floor setting. On top of that, you get higher ventilation effectiveness, which means even better mixing of the air. So even in an open floor plan, we still don't have private offices, there are things we can do, but we don't do them. But we can. There's certainly strategies that work.

John Macomber

One of the interesting things around the evolution of systems in innovation, most of the standards we're talking about were created when the building had one system either heating or cooling, it was on or off all the time and there was one thermostat somewhere. I remember when I first started teaching at MIT in the winter, we'd have the windows wide open because the radiator was cranking for somebody else. The second is that for a long time, all you could really measure was temperature and humidity. So the engineers were thinking about temperature, humidity, and they're thinking about one thermostat in the whole building. Now the buildings we've been in for the last 10 or 20 years have multiple thermostats, multiple zones and new buildings that Spencer Levy's talking about have controls in each room. And people can now measure these other components that go into cognitive function, notably carbon dioxide, volatile organic compounds and particulates. So a new elite building is one question, but then they have the second question of how do

you change the fleet? There are buildings around that are 100 years old and there are buildings being built now that are going to be for 100 more years. So innovations percolate really slowly. So that becomes one of the challenges for landlords and tenants and finance people also.

Spencer Levy

One of the things you mentioned a lot in this conversation and throughout your book is the measurement system, not of productivity, but of the air quality. I guess you can go right down to the personal system of a Fitbit or whatever you want to wear on your wrist. But it does bring up the issue of privacy. How do you address that issue as it relates to measuring the work environment, Spencer Levy?

Joe Allen

I think the era of an industrial hygienist that's people who go out and do indoor air quality surveys for workers all the time -- that era where you go out and have a \$10000 piece of equipment, a \$400 lab test, you write a report, it goes into the drawer desk of an executive -- those days are over. The proliferation of lower cost, real time monitors has democratized this monitoring thing. If you're not monitoring your buildings right now, you better believe your employees and customers are. It's happening. It's happening right now. Just go on Twitter or Facebook or Instagram. You'll see people posting the carbon dioxide concentrations in shops, coffee shops on airplanes. And they're shaming companies. Hey, Company X, why is the carbon dioxide two thousand parts per million in here. So that old era where it was, you know, I have to worry about privacy. Who's going to control the data? It's gone. It's just gone. The data are out there. If you're not collecting, others are. And I like it. We have a population now that, because of the pandemic, is super in tune with why and how indoor air quality matter and they want to measure it. Or if they're not measuring it, they're asking the questions of their employer. What is the carbon dioxide concentration here? How is the ventilation in this space? So I don't think it's a privacy issue anymore that's driving this conversation. The power dynamic has flipped. It's no longer in the hands of the building owner or the tenant. It's in the hands of the customer and the employees.

Spencer Levy

What types of permanent changes do you think we're going to see out of healthy buildings as a result of COVID?

John Macomber

Part of this, we don't totally know yet around the return to office kind of phenomenon. And of course, as all of your podcast guests have probably said, the death of retail has been accelerated by COVID, so we wait to see what comes out on the other side. I kind of look at this as a couple of possibilities. One is that we lick COVID and every other communicable airborne disease really soon. The other is we don't COVID-23 comes up, COVID-40 comes up, some other thing happens, the flu gets worse and you have to start living with these things as a global society. The second is how successful work from away actually is. It could be that people say, just love this. I'm never coming back. Or it could be

that the bosses say, you know this thing, we are on Zoom playing with your cat and I see you two hours a week isn't really cutting it. So all those things can happen. Add on to that what Spencer Levy has already said about people's awareness of how air quality impacts both cognition and health. People are never going to forget that COVID spreads through the air. They're not going to forget that. So that awareness of indoor air quality on the part of the occupiers is not going away.

Spencer Levy

As we start to wrap up, John, I'm going to ask you first and then Joe. Two or three tips. You're going to give every landlord out there right now with an older building. I will give the first tip and then you can follow. The first tip is to read the book *Healthy Buildings* by Joe Allen and John Macomber. But after that, John, two or three tips you'd give to a landlord out there with a older product.

John Macomber

Older, of course, is different than brand new. And if you're building a building in 425 Park Avenue and you're going to get \$150 and rent, that's different than somebody who's got twenty thousand square feet in the suburbs and they got, you know, two lawyers and the dentist and the dentist hasn't paid the rent in three months and you're only getting eight dollars net. Part of what we write about in the book is a hierarchy of controls. So the more the renters and the bigger the capital expenses, the more landlord can spend on capital improvements like fans, filtration, things like that. If you're getting eight dollars in rent, you're not going to do that. You're going to spend money as a landlord and administrative controls. You're going to take people's temperature on the way in. You're going to see if their tenants can stagger what their work hours are and those kind of things that don't require a lot of capital expense but make people feel safer during COVID. After that, I'd be looking at whether these buildings are going to get some kind of unhealthy discount going forward. So if tenants and lenders worry about liability, start being less interested in financing buildings that are demonstrably less healthy. Then you might see the cap rates go up on those properties and you also see that operating income go down because people won't want to rent there. We don't know when the market is going to start being aware of these things. Clearly, elite markets are all over it. It percolates at different rates. So I think I'd be thinking about how can I defend my building from being thought of as an unhealthy building going forward? And I'd be measuring what the air's like in there to be working with the tenants to say, see how nice it is here and maybe quietly de-acquisitioning some of the buildings in my portfolio that don't look like they're going to be the healthiest and go buy some other product. Do a 1031 or something and get a building that I think is going to stand the test of time a little more.

Spencer Levy

Joe, same question to you, but I'm going to put a little twist on it. Not what you should do, what shouldn't you do? And what I'm thinking about is during COVID, people were burning candles, had Fabreeze, Axe body spray all over the house. What should you do? What shouldn't you do?

Joe Allen

So let me start with what you should do and then also a little bit of the whatnot. And I think the first thing you should do is recognize that the healthy buildings movement is not just for the shiny new buildings in downtown New York City. It's a total misperception out there that, one healthy buildings are expensive and, two that it's only new buildings. In fact, from experience, we know that existing buildings can be healthy buildings. So start there to take stock of what you have to. Do that commissioning process. Where are you in this process? Go into the middle chapter of our book *The Nine Foundation of a Healthy Building*. Pick Ventilation, Indoor Air Quality. Start checking the boxes on some of these things. Make incremental improvements every time you do a capital upgrade and you're going to constantly be upgrading how well your buildings are performing. That means you're upgrading how you're how well your people are performing it. To John's point, it increases the competitiveness of the asset. Third, I would say, go out and measure it. Measure the performance of your building. Do indoor air quality surveys. Find out if you have a problem. Begin with and what is that problem? Is it legionella in the in the plumbing? Is it particles that are penetrating in from outdoors? Is it some other chemical, some VOCs and volatile chemical that you're not sure you're aware of? The only to know is to go out and measure it right? Make the invisible visible. Take the measurement and understand it forth to your point. What to avoid? Look, this is a time where buildings are getting a lot of attention, attention they'd never had. Same with health. And just like we had greenwashing in the green building movement, we're going to see a lot of health washing. We're already seeing products come on the market -- total snake oil here -- that is being pushed onto building owners. And so you'll see in the book and other places we've written, we stated tried and true evidence based measures. I like new technology, but if you're going to use it, you have to vet it carefully. One: Does it work? Does it do what it says it's supposed to be doing? And two: Is it healthy or does it create conditions that may lead to a worse effect? And believe it or not, many products being marketed right now during the pandemic actually lead to worse indoor air quality, despite being promoted as providing better indoor air quality. So you have to be really careful. And here's why you need to be careful: If you screw up energy in a green building calculation. OK, not the worst thing in the world. Not good, but it's not the worst thing about. You screw up health and you claim your building is a healthy building, you're in real trouble. You're gambling with people's lives. And there's trust involved there. You stamp on that building, it is a healthy building, you're inviting people into your building. You're giving them essentially some kind of a guarantee that you've taken your role seriously and you're providing a healthy indoor environment. Well, you better do that, right? So this is definitely not a domain or a time to cut corners in any way around your buildings and around health. So we think the book provides a roadmap. Everything in there is cited. It's evidence based. We can tie every recommendation back to the peer reviewed science, things we know, that work that work to provide better health, well-being and productivity for people in our buildings.

Spencer Levy

Well, on behalf of The Weekly Take, I'd like to thank John Macomber and Joe Allen talking about their book *Healthy Buildings, How Indoor Spaces Drive Performance and Productivity*. John Macomber, thanks for joining us.

John Macomber

Thanks for having us.

Spencer Levy

Joe Allen, thanks for joining us as well.

Joe Allen

It's great to be here. Thanks.

Spencer Levy

For more on healthy buildings and our show, check out [CBRE dot com slash the weekly take](https://www.cbre.com/the-weekly-take). As always, we appreciate your taking time to tune into our air. And we'd love your feedback as well. So drop us a note and of course, please subscribe rate and review us wherever you listen. In the weeks ahead, we'll return with other topics of interest. As our calendars turn to the holiday season, we'll browse the aisles of the retail sector. We'll also tee up a round of discussion on commercial real estate and -- you guessed it -- golf. And much more. For now, I'm Spencer Levy. Be smart. Be safe. Be well.