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How to Focus on Health and Wellness in Existing Buildings

Smart lighting and daylighting, better thermal comfort, and improved indoor air quality are three crucial aspects of improving occupant health and wellness.

By Jude Chakraborty and Kaitlyn Gillis [GREEN](#)

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differentiator is a necessity for building owners and facility managers.

We spend more than 90 percent of our time indoors and the impact of building design and operations on human health is well documented. In an age of competitive commercial real estate markets, creating a



Proper calibration and operation of daylight dimming controls can enhance occupant visual comfort and workplace experiences.

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The built environment can be used to attract and retain staff for those tenants — benefiting building owners and tenants. Strategies ranging from low to high effort and cost can be incorporated into existing buildings, from optimizing indoor air quality (IAQ) to providing amenities on-site like spaces for yoga and relaxation. The Organisation for Economic Cooperation and Development anticipates that with up to two-thirds of the building floor area that will exist in 2050 already in use, there are environmental co-benefits to retrofitting existing buildings, including the potential reduction of greenhouse gas emissions in both building operations and embodied carbon.

Benefits of design for people

Traditionally, there has been a focus on space and operational efficiency that has at times neglected to create a healthy environment for building occupants. As noted by the World Green Building Council's report, "Health, Wellbeing & Productivity in Offices," for typical business operating expenses, staff costs account for 90 percent of the total, with rent and energy accounting for 9 percent and 1 percent respectively. This breakdown shows that investing in health-promoting features can really benefit an organization's bottom line and help attract tenants into a building.

Due in large part to the understanding on how healthy buildings can benefit people, in recent years two certification systems have emerged on the market promoting health and wellbeing. The WELL Building Standard and the Fitwel Certification System provide comprehensive and evidence-based frameworks for new and existing buildings.



(Employee hubs with centralized kitchens or kitchenettes encourage building occupants to move more throughout the day. These spaces also promote socialization, contributing to occupants' mental health and well-being by combatting workplace loneliness. Photo credit: Stantec)

In 2016, [Dodge Data & Analytics](#) identified three major features of healthy buildings: better lighting and daylighting, enhanced thermal comfort, and enhanced indoor air quality. A close look at those areas reveals many opportunities for improvements to existing buildings.

Indoor air quality

Poor IAQ costs the U.S. economy a whopping \$168 billion per year due to direct medical care and absenteeism. Another big problem is “presenteeism,” when employees come to work when still not fully recovered, resulting in a big loss both in quantity and quality of work performed. In 2004, [a study published by the Harvard Business Review](#) found that “presenteeism” is 7.5 times more costly than illness-related absenteeism, because of the increased risk of employees infecting their coworkers.

Sick building syndrome is caused by being in a building or enclosed space with poor IAQ or poor lighting. Symptoms include throat irritation, breathing issues, runny nose, tightness in chest, allergies, headaches, body aches, lack of focus and concentration, and fever. The World Health Organization estimates that up to 64 million U.S. office workers and teachers are at risk of suffering from sick building syndrome. According to the U.S. Consumer Product Safety Commission, about 30 percent of all new and remodeled buildings have poor IAQ. Those are mind boggling numbers. Studies found that more than 75 percent of the time, poor IAQ in buildings is HVAC-related.

Efficient and well-designed HVAC strategies can promote health and wellbeing within an existing space through better IAQ. New construction projects should invest in better HVAC design, including dedicated outside air systems, natural ventilation, radiant systems, displacement ventilation systems, IAQ sensors, and other strategies that can not only promote better IAQ but also save energy and provide enhanced thermal comfort.

The challenge lies with existing buildings where occupants must live with the existing systems, which may be old and contribute to poor IAQ. An HVAC filter upgrade is one of the least expensive ways to improve IAQ, and — along with replacing filters when needed — one of the easiest changes building owners and facility managers can make to meet occupant demands for better IAQ and healthier work environment. High-performance air filters include:

- **MERV 13 filters:** MERV or Minimum Efficiency Reporting Value is an acronym used by ASHRAE to rate the effectiveness of filters at removing particulates from the air. To achieve a MERV 13, a filter must catch 90

percent of particles in the 3-10 μm range, 90 percent of particles in the 1-3 μm range (that's the range of particulate matter which EPA classifies as fine inhalable matter and is about 30 times smaller in diameter than a human hair) and 50 percent of particles in the range of 0.3-1 μm (that's very, very small).

- **MERV 13 filters with low pressure drop:** One of the drawbacks of MERV 13 filters is that they add resistance to air flow, increasing the pressure in the duct system and thereby raising energy consumption. With low pressure drop systems, fans in the ventilation system need to overcome less resistance to deliver the required air flow, thereby saving fan power consumption.

- **Active carbon filters:** These filters go beyond particles and stop gases and odors from recirculating through the air system. Activated carbon filters use charcoal that is treated with oxygen to make the charcoal more absorbent. During operation, oxygen opens up millions of tiny pores in the charcoal (carbon) where gases and odors are trapped.

According to a Harvard study on green buildings, better IAQ can increase productivity by 11 percent, or \$6,500 per employee per year, and that's a win-win case.

Lighting systems

Light is essential to perception of color, form, and texture. It is also very important to human health as it regulates the circadian rhythms — that is, our sleep-wake cycle. In workplaces, daylighting boosts productivity, focus, and concentration. Though lighting designers and engineers are developing

electric lighting systems to accommodate the circadian rhythm function, the first and most basic step will be providing access to daylight through massing and façade optimization.

We spend about 90 percent of our time indoors — mostly in the workplace — and in most existing buildings, given such issues as building depth and glare, daylight may not provide sufficient or efficient lighting design that complements the circadian rhythm of occupants.

Proper calibration and operation of daylight dimming controls can enhance occupant visual comfort and workplace experiences. The same goes for controls for personal/occupancy sensing and user interaction. A lighting control strategy that is interactive and approachable not only gives building occupants the flexibility to control lights to their needs but also empowers them to control their environment which leads to greater satisfaction.

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How Design Should Encourage Movement, Improve Health and Wellness

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important. Here are some design and operational tips

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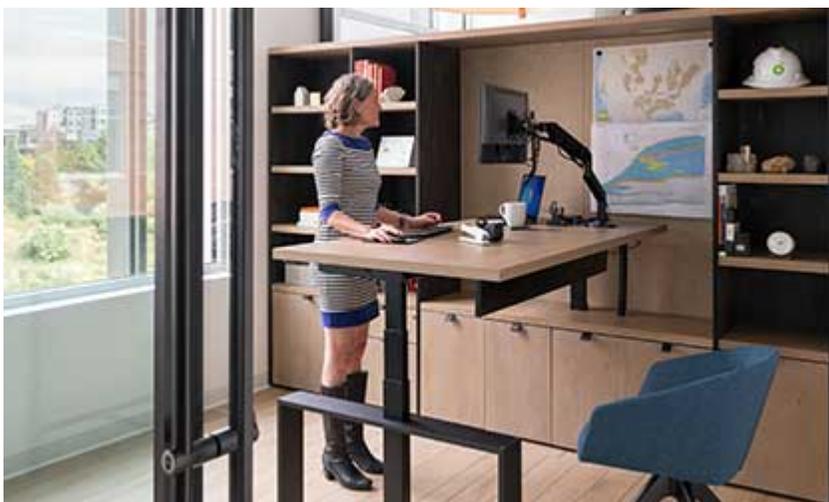
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The amount of time spent inside, due to traditional work styles, is often in a seated position. While providing opportunities for sitting is essential for health, the sedentary nature of a typical wo

itself well to a flourishing work environment.



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Research from The Mayo Clinic suggests that sitting for more than 8 hours per day, coupled with no exercise, has similar mortality risks to smoking and obesity.

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The inactive nature of most North Americans has become such commonplace that sitting has often been called “the new smoking.”

Research from The Mayo Clinic suggests that sitting for more than 8 hours per day, coupled with no exercise, has similar mortality risks to smoking and obesity.

Musculoskeletal issues are the number one reason that most office workers miss work in Canada and account for 34 percent of total lost workdays in the United States. Ergonomic furniture can help, as can providing and encouraging opportunities for more movement throughout the day.

A variety of strategies, ranging from low to high effort, can help promote movement and improve ergonomics in the workplace. Activated lobby areas that provide healthy coffee, tea, and food options will often encourage building occupants to move more throughout the day. These spaces also promote socialization, contributing to occupants’ mental health and wellbeing by combating workplace loneliness. Centralized kitchens or kitchenettes in each tenant space also foster employee interactions. Removing trash bins from individual workspaces can also encourage employees to move around. Artwork, natural images, and colors draw people to walk more along various circulation pathways.

Fun stairwell design features — music, gamification, and appealing colors — encourage occupants to take the stairs. Revolving artwork in stairwells offers a fresh space that draws traffic and keeps employees in motion. The benefits of taking the stairs are significant, from increased aerobic fitness and bone

density to reducing weight by up to six pounds per year. Ideally, central stairs that are easily visible, even through glazed walls, can be a stronger reminder to occupants. Positive messaging around elevators points people to the stairs while acknowledging that people have varying physiological needs and some may not be able to use the stairs.



(Fun design features encourage occupants to take the stairs. For example, revolving artwork in stairwells offers a fresh space that draws traffic and keeps employees in motion. Photo credit: Laughing Dog)

There are various active workstation features that can be included in the office. For example, sit-stand desks can lower obesity rates and improve cardiovascular and musculoskeletal health. Our ball and socket joints, such as hips and shoulders, are not typically used in their full range of motion when sitting in a chair all day, and sit-stand desks can allow for a greater range of motion. Dynamic workstations such as treadmill and cycling desks are another option. Allocating one or two of these as a hot desk option in an office could be a good way to increase movement.

Amenities for active transportation are another major wellness opportunity that building owners and facility managers can include in base building design. More and more office workers are choosing to either fully or partially use active transportation options as part of their commute to work, so providing bike storage and equipment and showers and change rooms make it that much easier for staff. This includes people who commute year-round, regardless of the season or weather. Some winter cities promote cycling to such a degree that the paths are maintained on a daily basis.

With proper planning, design, and operations, health and wellbeing for occupants can be cost effective. WELL and Fitwel are specialized certifications catering to occupant health and wellbeing and can be the cumulative results of all the strategies employed. But as a starter kit, steps like those described above can lead to an enhanced occupant experience which helps boost productivity, aids in talent retention, and provides a solid return on investment.

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