



# HEALTHY BUILDINGS: HEALTHCARE

As the front lines of the COVID-19 pandemic, healthcare facilities have faced critical challenges in caring for larger numbers of patients while ensuring safety and minimizing spread of the disease. Throughout the U.S. and many countries, outbreaks of COVID-19 in hospitals continue to devastate patients and healthcare workers alike.

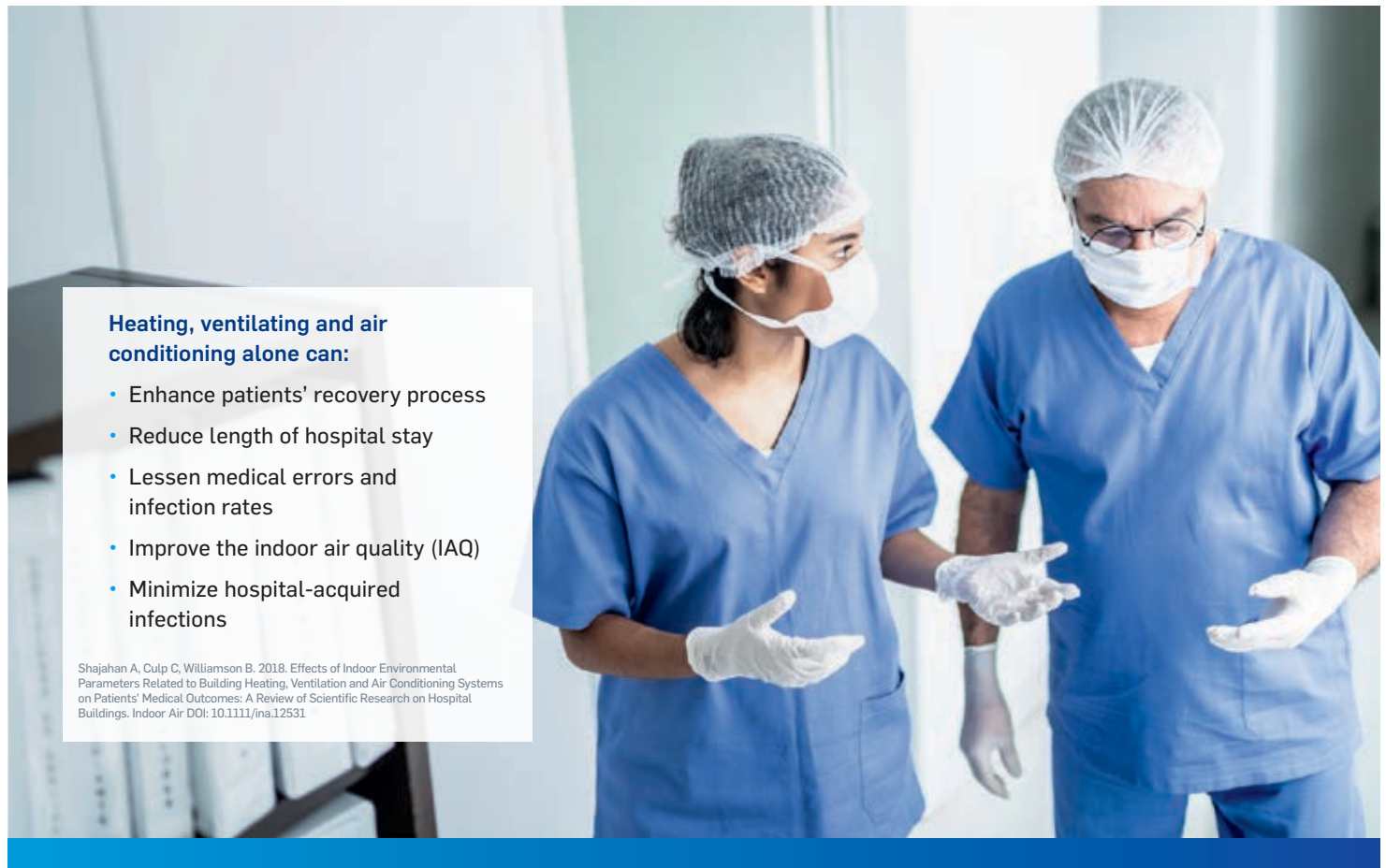
Against this backdrop, it's become clearer than ever that the need to minimize disease transmission impacts every aspect of the built environment. That's where healthy building strategies come in. By focusing on creating healthy indoor environments, today's healthcare facilities can help improve infection control in the short term, and enhance patient experiences and outcomes, staff productivity and building efficiency moving forward.

## HEALTHCARE PRIORITIES



## THE SCIENCE OF HEALTHY INDOOR ENVIRONMENTS

While the current urgency around healthy indoor environments in hospitals revolves largely around stopping the spread of COVID-19, research has shown the potential impact of healthy environments to be much greater.



### Heating, ventilating and air conditioning alone can:

- Enhance patients' recovery process
- Reduce length of hospital stay
- Lessen medical errors and infection rates
- Improve the indoor air quality (IAQ)
- Minimize hospital-acquired infections

Shajahan A, Culp C, Williamson B. 2018. Effects of Indoor Environmental Parameters Related to Building Heating, Ventilation and Air Conditioning Systems on Patients' Medical Outcomes: A Review of Scientific Research on Hospital Buildings. Indoor Air DOI: 10.1111/ina.12531

In addition, the [COGfx Study](#) has shown that healthy buildings can significantly improve cognitive function, while the [HEALTHfx Study](#) revealed the benefits of healthy buildings on societal health and climate. All in all, we're seeing that healthy buildings can impact the patient experience and the bottom line for healthcare facilities.



**WE SPEND  
90%  
OF OUR TIME  
INDOORS**

We can use healthy building environments to:

### IMPROVE COGNITIVE FUNCTION

in enhanced green buildings

Crisis response scores 

**131% HIGHER**

Information usage scores 

**299% HIGHER**

Strategy scores 

**288% HIGHER**

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### IMPROVE PERSONAL HEALTH

in high-performing, green-certified buildings vs. high-performing, non-certified buildings

Sick building symptoms 

**30% FEWER &**

better environmental perceptions

Sleep quality scores 

**6.4% HIGHER**

### IMPROVE SOCIETAL HEALTH

Compared to "conventional commercial buildings," the green-certified buildings studied saved

**€6.1** in energy costs 

**€4.7** in combined health and climate benefits

**Total benefit of €10.95 for 2000-2016**

**€1.15** from averting negative impacts of climate change 

**€3.62** from reductions in air pollution resulting in fewer deaths, hospital visits, lost days of work and school, and more 

Primary support for the study came from Carrier. MacNaughton P, Allen J, Satish U, Laurent J, Flanigan S, Vallarino J, Coull B, Spengler J. 2016. The Impact of Working in a Green Certified Building on Cognitive Function and Health. Building and Environment DOI: 10.1016/j.buildenv.2016.11.041

Primary support for the study came from Carrier. MacNaughton P, Cao X, Buonocore J, Cedeno-Laurent J, Spengler J, Bernstein A, and Allen J. Energy Savings, Emission Reductions, and Health Co-Benefits of the Green Building Movement. 30 January 2018. Journal of Exposure Science and Environmental Epidemiology.

## CARRIER HEALTHY BUILDINGS PROGRAM

As the inventors of modern air conditioning and a world leader in HVAC, refrigeration, and fire & security solutions, Carrier has a legacy of creating safe and comfortable buildings. Now we're building on that legacy through the launch of our Healthy Buildings Program. Our experts have in-depth knowledge and experience in healthcare and a holistic suite of healthy building technologies and services to address the immediate pandemic concerns and long into the future.

## HEALTHY BUILDINGS ASSESSMENTS FOR HEALTHCARE

At Carrier, we understand that many of our healthcare customers are facing uncertainty with how to move forward in developing a healthy building strategy. Our experts are here to help – starting with assessments across various aspects of your facility.



**SAFE START SERVICES**

Ensure building is ready for occupancy

Rigorous recommissioning of HVAC equipment

Implement best practices (possibly remotely)



**EMERGENCY ASSETS**

HVAC equipment on demand to reopen quickly and safely

Detailed site evaluations

Ensure system is able to meet your new ventilation and IAQ requirements



**IAQ ASSESSMENT**

Test air quality

Develop and implement upgrades for optimal filtration, ventilation, airflow, controls, etc.

Develop corporate-wide IAQ engineering standards



**WELLNESS ASSESSMENT**

WELL building standard certification

WELL performance testing



**SECURITY ASSESSMENT**

Provide security solutions and upgrades

Contactless access management, body temp screening and video analytics

Remote monitoring and diagnostics

## HEALTHY BUILDINGS SOLUTIONS FOR HEALTHCARE

Carrier offers a full suite of products and services designed to help create safe and healthy environments for patients and staff. The following are just a few highlights of our offering.



### ADVANCED AIRSIDE SYSTEMS



FRESH AIR MANAGEMENT  
ENERGY MONITORING  
CO<sub>2</sub> LEVEL CONTROL

### ROOFTOPS



CARBON FILTERS  
BIPOLAR IONIZATION  
CO<sub>2</sub> SENSORS

### ACTIVAIR HYBRID HYDRONIC AIR TERMINAL



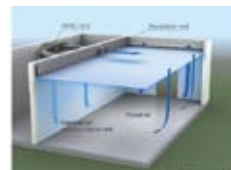
LOW HEIGHT PROFILE  
MODULATING CAPACITY AND LOAD REACTIVITY  
HIGH VENTILATION CAPABILITIES

### AIR HANDLING UNITS



FRESH AIR MANAGEMENT  
HEPA FILTERS / CARBON FILTERS  
UV LIGHTS / BIPOLAR IONIZATION

### STRETCH CEILING TECHNOLOGY



HIGH INDOOR AIR QUALITY AND HIGH ENERGY EFFICIENCY  
THERMAL AND ACOUSTIC COMFORT COMBINED  
WITH INFINITE CUSTOMIZATION

### AIR PURIFIERS



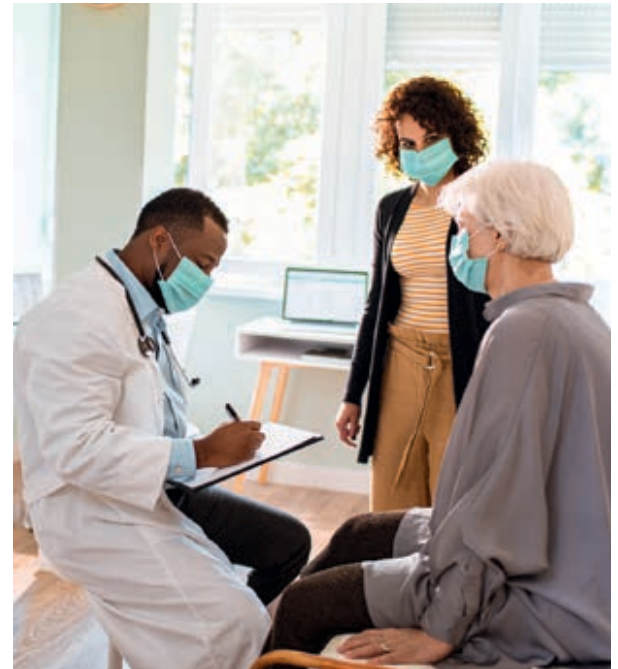

PORTABLE SOLUTIONS  
HEPA FILTERS / CARBON FILTERS  
UV LIGHTS / BIPOLAR IONIZATION



We will work with you to fully understand the needs of your business.


Our building protection services help to ensure high-quality air by keeping the building's HVAC system properly maintained.

Our BluEdge service platform is designed to meet your requirements and keep your equipment running efficiently.

### PREDICTIVE MAINTENANCE

- Remote connection through BMS manages IAQ and ventilation in line with best practices
- Make changes and fix issues remotely
- Optimize maintenance and operational costs
- 24 x 7 command center



### HVAC EUROPEAN CONNECTED SERVICES PORTAL


- Provide advanced remote analytics
- Optimize energy efficiency, equipment uptime, occupant comfort and operational productivity
- Actionable insights by different communication protocols
- Optimize autonomously or through a remote application

## RETROFIT SPARE PART SOLUTIONS FOR HEALTHCARE



### INNOVATIVE TECHNOLOGIES

- M5 filters
- New filtering media technologies
- High filtration efficiency on PM2.5 particles



### ADD-ON RETROFIT ALTERNATIVES

- AHU-UVC add-on kits
- Carbon surface & F7 filtering technology options
- Add-ons are easy to install in the universal frames of existing AHUs
- Effective against viruses, bacteria, small particles and VOCs



### RANGE OF FILTRATION SOLUTIONS

- High-efficiency filtration solutions
- A large variety of air filters
- Solutions for our full product range (AHU, RTU, TFCU)
- More than 1300 references of air filters to cover all sizes / filtration needs

### GET STARTED WITH AN EXPERT

From safe business reopening to ongoing enhancements to customer experiences, a healthier future starts indoors. Let's work together to unlock the potential of healthy hospitals. Visit us at [carrier.com/healthybuildings](https://carrier.com/healthybuildings) to learn more about our Healthy Buildings Program and connect with one of our experts.

