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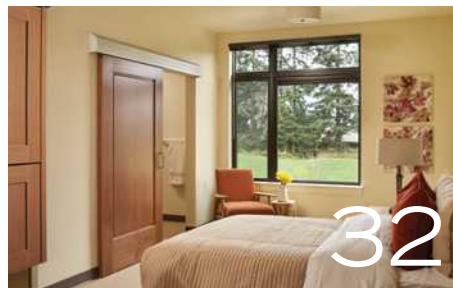
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ON THE COVER // Image by Getty Images

HFM is the official publication of the American Society for Health Care Engineering of the American Hospital Association

# Let's bring our data 'A game'



**Shadie (Shay) R. Rankhorn Jr.**  
SASHE, CHFM, CHC,  
ASHE President

In June, I wrote about the American Society for Health Care Engineering (ASHE) Annual Conference & Technical Exhibition, which I believe embodies the core of cutting-edge education and strong community within our profession. Accessible, up-to-date education and a supportive professional network are vital to maintaining our role as indispensable contributors to patient care and ensuring a rewarding and valuable career for emerging health care facilities professionals.

Another critical component of our success and progress is data collection and sharing. Geoffrey Moore stated, "Without 'big data,' you are blind and deaf and in the middle of a freeway." The significance of proper data collection, analyzation, reporting and utilization in health care facilities management is increasing daily for individual organizations and from a regulatory perspective.

Establishing data baselines, maintaining existing and incoming data, and leveraging metrics are instrumental to making productive and informed decisions for an individual facility. Instituting ourselves as the owners and interpreters of our facilities' metrics will encourage leadership to partner with us when making decisions that will affect both the physical well-being of our facilities and their occupants as well as the organization's financial success.

We have the role and obligation to keep not only our own teams informed by data collection processes and policies, but the collective profession as well. And if each of us focuses on developing and engaging diverse professional networks that share accurately sourced data, we can enhance our own education, contribute to the education of other teams worldwide, and provide a better healing environment for our patients and caregivers.

In addition to using data collection, analysis and reporting to inform and support our internal and collective decision-making, it is our responsibility to help standards organizations and regulators submit appropriate and achievable regulations that are scientifically valid through — you guessed it — meaningful and accurate data. This month's *Health Facilities Management* cover story discusses current trends in compliance and advocacy, many if not all of which require quality data for accuracy and success.

What data collection initiatives can you spearhead at your health care organization?



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# Overcome Facilities Resource Scarcity with Innovative Project Delivery

Healthcare facilities are in the midst of a slow-burning resource scarcity crisis. With so much to do and fewer resources at your disposal, now is the time for facilities leaders to embrace innovative solutions to their operational challenges.

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## ADVOCACY ADVISER

# Leading a quality health care operation

**B**efore starting a discussion on leading quality operations, health care facilities professionals must realize one important truth: One cannot credibly lead what isn't truly believed. Do more than "walk the talk."

Adopting a philosophy that pursues continuous quality improvement as a state of mind and that directs a path through life and in all that one does will build a "self-culture." This will improve not only the quality of one's health care operation, but one's life as well. It must become a never-ending quest for excellence.

Start by defining what is meant by the word "quality" and the expectations the word implies:

- Does it mean all preventive and predictive maintenance tasks are completed on time?
- Does it mean answering repair calls within a specified time range?
- Does it mean completing service tickets correctly on the first attempt?
- Is it a combination of the aforementioned?
- Or, possibly, something else entirely?



**Mitchell L. Allen**  
 MBA, MAOC, FASHE,  
 retired and active  
 with Hawaii Chapter  
 of ASHE

Whatever is decided, make sure the plan or the combination of plans is measurable. Management without

measurement is fruitless! Continuous and early measurement tells the manager if progress toward a goal or goals is being made and allows for course correction if warranted.

Don't try to do this alone. A cadre of believers is needed. Recruit a core group to help guide things along. More importantly, someone will be needed to carry on after the initial leader moves on. Studies show that most change efforts only last five years. Make sure the efforts that will be implemented outlast this range.

To gain buy-in, use the team that has been formed to help set the goals and the metrics for measurement. These goals should be part of a long-range plan that includes small incremental steps.

Plan for success and, by all means, celebrate each time an achievement is reached. That will help maintain the momentum needed on the march to a sustainable quality operation. After all, that should be the ultimate mission of a quality initiative. **HFM**



**QUESTION:** I am part of a team developing operational design approaches for a new acute care hospital. Different staffing models are being discussed, with many not including 24/7 coverage by support staff. Questions have been raised about the alarms that need to be monitored and which employee groups would be asked to monitor them. I'm interested in hearing about other experiences.

I would first start by discussing it with your state authority on what they will or will not allow. In both of my previous experiences with this approach, the only location in which they would let us use the remote panels was the emergency department (ED), because that was the only place where we could guarantee 24/7 monitoring by a person. We placed remote monitors for medical gas, nurse emergency calls, the fire alarm, generators and the fire pump. At one organization, we remoted them all to a central monitoring station that had paging abilities at each site they monitored. The other organization only sent the fire alarm and nurse calls to the off-site

location. The rest were auto pages to the facilities department and locally in the ED. Secondary systems such as elevator call boxes, security panic alarms and door intercoms were all routed to the remote switchboard. The first lesson learned is that the alarms can be a nuisance for ED staff, and you must constantly check them for tampering. I would send as many as I could remotely and give staff the ability to silence or acknowledge the alarm. The second lesson is to automate voice announcements such as Code Blue and fire as much as possible to eliminate the need to manually do it. The final lesson is to be honest with ED staff on the level of disruption from the alarms and their responsibilities regarding them. **HFM**



**JOIN THE Q&A ONLINE!**



ASHE members can go to [my.ashe.org](http://my.ashe.org) to ask or answer questions from colleagues. If we choose your question or answer for this column, we'll send you some ASHE swag as a token of our appreciation for contributing to the My ASHE online community.

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## Hospital designed for expansion

**S**arasota Memorial Health Care System's (SMHCS's) new greenfield hospital provides a growing community with a convenient source of high-quality, advanced care in a modern hospital environment. Sarasota Memorial Hospital – Venice is the public health system's second full-service hospital and represents the most significant expansion in its 96-year history.

The patient-centered, technology-integrated hospital offers a comprehensive array of emergency, medical and surgical care, including cardiology, orthopedics, intensive care, and labor, delivery, recovery and post-partum care. The 365,000-square-foot, five-story hospital opened with 110 private patient suites, a 28-bed emergency care center and eight surgical suites.

The campus and building were planned and designed to accommodate significant future growth. The positioning of the hospital on the site allows the building to expand to three times its current size. An expansion is already planned that will add an additional 68 private patient suites, boosting the total bed count to 178. The campus was master planned to accommodate another 500,000 gross square feet of medical office and research building space.

The expansion plans include two plug-and-play patient towers on the backside of the hospital, protecting the front door and patient experience from any future disruption from construction. Similarly, key services such as the emergency department, surgery, imaging and food services were designed to easily expand without disruption. The early, thoughtful planning will allow the hospital to grow with the community.

With increasing stressors to health care systems, especially to hospital facilities – including pandemic conditions and worsening storms – planning purposeful resiliency measures into hospital design is crucial. Located in Venice, near Florida's Gulf Coast, Sarasota Memorial Hospital – Venice was designed to maintain operations during and after hurricanes up to Category 5. The exterior and roof are designed to limit penetrations that could be damaged or compromised in a storm. The facility's customized, resilient design also includes efficiencies for energy demand and water use in normal operation, as well as effective passive design – all providing a stable foundation for resiliency and sustained operations in the event of a storm.

Additionally, in response to lessons learned from the COVID-19 pandemic, modifications were made mid-project to expand the negative-pressure ventilation system to convert all or a portion of the intensive care unit critical care pods into pandemic units if needed.

This flexible, cutting-edge hospital is designed with the latest technology to provide the community with a progressive treatment environment that will support the level of patient care for which SMHCS is known. Networked information technology connects Sarasota Memorial Hospital – Venice and other care centers across the system, ensuring that patients can receive an uninterrupted continuity of care across all SMHCS locations. **HFM**

**FACILITY //**  
Sarasota Memorial  
Hospital – Venice

**LOCATION //**  
Venice, Fla.

**ARCHITECT //**  
Flad Architects

### LEARN MORE

View more projects like this by visiting ASHE's Architecture for Health Showcase at [archshowcase.org](http://archshowcase.org).

## ARCHITECTURE SHOWCASE

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PLANNING

## Hospital evolves infant care with new design and technology

In February 2022, Jacksonville, Fla.-based Baptist Health and Wolfson Children's Hospital opened the new Borowy Family Children's Critical Care Tower, the "new front door" to the entire Baptist Medical Center and Wolfson Children's campus, expanding its neonatal and pediatric critical care services through northern Florida and southern Georgia.

The seven-story, \$224 million building includes a high-level neonatal intensive care unit (NICU), a pediatric intensive care unit (PICU), neuro intensive care beds, a cardiovascular intensive care unit (CICU), and one of the first pediatric burn and wound beds in northeast Florida.

"With the Borowy Tower, we have created a very special place for families to be with their children when they need them most," says Baptist Health System Director of Construction Kimberly Hansen. "The new neonatal center replaces [a] previously space-constrained neonatal intensive care unit, where bassinets were lined up in an open bay and parents only had access to recliners for bonding time."

The tower features spacious patient suites with private bathrooms so parents can stay overnight.

"Our average NICU length-of-stay is one month," says Wolfson Children's Hospital President Michael D. Aubin. "That helped drive our decision to build this new tower the way we did."

Patient suites in the tower also accommodate ever-evolving health care equipment and technologies, with longevity in mind.

"We anticipate using this building for at least half a century, and beyond," Aubin says. "So, we decided to use the universal design approach, which means that the space around the patient is large enough to accommodate any age in the future."

Designers created full-sized mockups of the new NICU and PICU rooms, allowing nurses and other caregivers to make suggestions, plan workflows and apply scenario-planning to ensure that space was configured and proportioned for future uses.



Clinicians were able to test mock-up designs before the NICU patient suites were finalized.

"One of the watchwords for this project was 'intentionality,'" says Frank Brooks, the principal at architectural firm FreemanWhite, a Haskell Company, and the person in charge of the project from inception through construction.

"Going from working in close quarters in an open unit to individual rooms was a cultural change, and we were very intentional in helping the staff figure out how to work in a completely new environment," Brooks says.

Light and sound were among the crucial elements considered. Decibel levels of mechanical systems and even human conversation were lowered through design and materials, including insulated glass and specialized room shades, in order to help reduce sound transmission and stress on infants' delicate hearing.

The area was severely impacted by Hurricanes Irma and Matthew, so flood risk was a challenge. The Tower is five and a half feet higher than older campus buildings but matches the elevations of the newer Baptist Medical and Wolfson Children's Hospital and Baptist Medical facilities, easing movement across the

main campus while lessening potential flood disruption.

State-of-the-art technology includes the first-ever Phillips Predictive Analytics System in all 127 new patient suites. This first-of-its-kind platform will use machine learning (artificial intelligence) to gather and display data from multiple sources — from vitals to lab and imaging results — on a screen attached to every NICU bed. Based on specific patient parameters, the touch screen will use yellow, red and green indicators to help neonatologists and other clinicians predict trends that could indicate an adverse event, such as respiratory failure or stroke.

"Through the use of predictive analytics, clinical teams will be able to identify trends early-on and respond proactively," Aubin says.

The Embrace Neonatal MRI, a self-shielding scanner designed for neuro-imaging of the smallest and most vulnerable newborns, keeps babies warm during the scan and allows parents to remain nearby. It is the first such system in place in Florida, and only one of four in the world. // BY BRIAN JUSTICE

## ARCHITECTURE

## Student design challenge fosters early collaboration

For the past seven years, the annual International Summit & Exhibition on Planning, Design & Construction (PDC Summit) has created a space for students studying those fields to put their classroom lessons to work in a competition called the PDC Planning & Design Student Challenge.

Chaired by Eugene Damaso, AIA, ACHA, NCARB, GGP, EDAC, director of design at RLF Architects, the challenge brings together 25 students from five different schools and disciplines for a 48-hour collaborative design charette.

This year's competitors gathered for the summit in New Orleans in March. Five students each hailed from the University of Kansas School of Architecture and Design, Kent State University College of Architecture & Environmental Design, Penn State College of Engineering, the Texas A&M University Department of

Construction Science and Louisiana State University Health Sciences Center (LSUH-SC) School of Nursing.

The overall challenge is to plan a health care facility complete with architectural requirements, a clinic staffing plan, engineered systems and infrastructure, and a construction plan and budget. However, as the PDC Summit travels to a new city each year, challenge particulars are modified.

The goals of this year's challenge took on a New Orleans flavor with the help of local architectural firm Sizeler Thompson Brown Architects (STBA). The challenge focused on the concept of modern health care requiring multiple solutions and flexibility, epitomized in one of the historic "melting pot" cities of the world.

The students were taken to a site in the New Orleans warehouse district, which has transitioned from an area of abandoned warehouses and old sailor hotels into one impacted by gentrification and tourism while also remaining an area for people experiencing homelessness.

Kent Spreckelmeyer, FAIA Emeritus, professor of architecture at the University of Kansas, served as one of the mentors.

"The students picked up on those kind of competing needs — the increasing tourism, increasing gentrification and also



From left: Eric Perchiuzzi, Jared Batiste, Donald Black, Meeranali Muntyajali Saiyad and Hossein Mirzajani won the challenge for their design concept "Everyone is Family."

increasing populations in need who have not only been traditionally present but have now been exacerbated by the pandemic," Spreckelmeyer says.

The students were given basic requirements — a primary clinic with 20 exam rooms, urgent care clinic with 12 exam rooms and academic support center.

Students say that the challenge has opened their eyes to new opportunities.

"My group welcomed and insisted that I give my input," says Jared Batiste, a student at LSUHSC School of Nursing. "They had an understanding of how crucial the nursing or health care professional viewpoint is to this project." // BY JAMIE MORGAN



## Preparing business occupancies for accreditation surveys

Are a hospital's business occupancies ready for survey? With a push from the Centers for Medicare & Medicaid Services (CMS), one accreditation organization has moved forward with plans to increase compliance through surveys. Since July 1, 2021, The Joint Commission (TJC) has a total of 29 elements of performance that will be used to survey business occupancies. While other accreditation organizations have not

defined how their own processes will work, they may follow one similar to TJC's as CMS continues to zero in on life

safety compliance on non-hospital occupancies. The key to a successful survey will be providing critical building information.

Much of the required information that is included in health care or ambulatory health care occupancy life safety drawings is not relevant to business occupancies. Providing drawings for a business occupancy may seem like a daunting task, but there is no reason to be intimidated. Getting started can be as simple as gathering all available information and starting on paper. Not all business occupancies will require life safety drawings, especially if it is a standalone business occupancy. However, having drawings

that include the relevant information is a good best practice.

A facilities manager must be able to provide key details about the space, such as the construction date and type; freestanding or adjoining spaces, including exits that lead from one space to another; design occupant loads; and whether the building is an existing or new business occupancy. Additional information such as fire sprinkler systems, fire alarm systems and hazardous areas are also important to note if present.

Another key point is inspection, testing and maintenance (ITM) for life safety features. The National Fire Protection Association requirements for fire alarm and sprinkler testing apply to all occupancies, as do many of the electrical testing requirements such as egress lighting and exit signs and generators, if equipped. The ITM documentation process begins with an inventory and ends with correctly filed documentation. It's important to remember that deficiencies must be addressed with a risk assessment, and an interim or alternate life safety measure may be required as a result.

Members of the American Society for Health Care Engineering can visit the link in this column to access a tool that will help in conducting a self-assessment and determining current level of compliance. // BY JASON LEA, CHC, CHFM, CHPEW, CPE AND MARK CHRISMAN, PH.D., P.E.

### MORE ONLINE

For links to resources, log on to [ashe.org/businessoccupancy](https://www.ashe.org/businessoccupancy).

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**VALUABLE RESOURCES AVAILABLE FROM ASHE**

Visit [ashe.org](http://ashe.org) to learn more about the following resources available for health care facilities professionals:

**Become a leader in sustainability**

ASHE's long-standing Energy to Care program creates resources and tools to help health care facilities professionals manage and improve energy usage. It also provides the Energy to Care Dashboard Tool, a free tracking system that provides an at-a-glance view of health care facilities' energy use, and links to the Environmental Protection Agency's ENERGY STAR Portfolio Manager. Other highlights of the program include its sustainability tips, energy conservation measure resources and the Energy to Care awards.

**Get back to the basics with introductory handbook**

The *Introduction to Health Care Facilities Management* handbook is part of a larger competency-based series covering several areas of facilities management. The in-depth 130-plus page introductory book provides an orientation to the dynamic field of health care facilities management. Along the way, the handbook provides tips and anecdotes from seasoned health care professionals that will be valuable to newcomers, engaging to experienced health facilities managers and thought-provoking to other health care professionals.

**Course teaches how to manage life safety**

Deciphering the various requirements of NFPA 101®, Life Safety Code® and other standards is an intricate process. That is why ASHE created the Managing Life Safety Program online training course. The livestream course will provide health care facilities teams with the information and resources needed to manage a life safety program. This course ensures participants have the necessary information and resources to successfully manage programs as standards change.

**Project Firstline series focuses on ventilation**

ASHE has teamed with the Centers for Disease Control and Prevention on a new video series geared toward clinical staff. The video resources are part of the Project Firstline initiative. The free resources build on knowledge of why ventilation is critical to the health care environment and equips clinicians with the essentials of what they need to know about airflow and negative-pressure rooms to keep themselves, patients and colleagues safe.

**ASHE Advocacy Tools address common challenges**

ASHE's resource library is filled with tools to address common challenges experienced by health care facilities staff. The tools are free to ASHE members and cover topics such as predictive maintenance, behavioral health safety, employee scheduling, infection control risk assessment and more. The resources are created by those involved in the ASHE Member Tools Task Force.

**Showcase features excellence in health care design**

The Architecture for Health Showcase highlights the latest health care facility design and construction projects from firms across the country, from specialty projects like pediatric facilities and oncology centers to outpatient facilities like medical office buildings and ambulatory care centers. ASHE encourages visitors to check out the exceptional projects housed in its online compendium and the firms behind them.

**SUSTAINABILITY**

**Hospital bypasses landfill during recent move**

OhioHealth's pledge of zero waste takes a community effort, as displayed in a recent move that included recycling seven tons of material.

OhioHealth O'Bleness Hospital, one of a dozen hospitals under the health system's banner, recently moved one of its medical office spaces into a new facility. Although the move was successful, it required leaving behind equipment, furniture and other items that were no longer needed. Instead of sending the items to a landfill, however, O'Bleness put a plan in place to recycle, upcycle and reuse much of what was collected.

Furniture from the clinic was sent to area thrift stores, and plastics and scrap metal were recycled. More than a ton of medical equipment — including scales and infant exam tables — were sent to MedWish Cleveland, which works to repurpose discarded medical supplies and equipment to provide humanitarian aid to people in need. In total, the hospital was able to keep 93% of the materials collected out of landfills.

"All hospitals and medical clinics manage a large amount of waste, but we are committed to delivering care while reducing our environmental footprint," says LeeAnn Lucas-Helber, president of OhioHealth O'Bleness Hospital.

The initiative was part of a greater mission established by OhioHealth in 2016, when the health system took nonprofit Rural Action's Zero Waste Pledge and worked with the organization to create a campuswide recycling program and other sustainability initiatives. // BY JAMIE MORGAN



O'Bleness Hospital donated furniture to local thrift stores as part of its zero-waste initiative.

IMAGE COURTESY OF RURAL ACTION

## ENGINEERING

## Health system reaches for carbon negative

Seattle-based Swedish Health Services, one of the largest non-profit health care providers in the Northwest, includes eight hospitals, more than 120 clinics and over 12,000 employees. The organization is in the process of building two new towers at its flagship campus, First Hill, both of which are integral to the organization's plan to make the entire system carbon negative by 2030.

"Hospitals operate 24 hours a day, seven days a week, and they are very impactful on the environment," says Chief Real Estate Officer Mike Denney.

In partnership with Vancouver-based Creative Energy, which develops and operates district energy systems that are designed to reduce greenhouse gas

emissions, almost 9,000 tons of carbon dioxide will be eliminated annually at First Hill. That is equivalent to removing 1,800 cars from the road.

The project involves modernizing the infrastructure of the First Hill campus to reduce wasted energy by capturing excess heat, which can be used to heat its facilities without consuming additional energy. Thermal storage also will allow off-cycle cooling and improve Swedish's ability to manage the temperatures in its facilities.

"We are technology agnostic, meaning that we package different technologies to supply energy in a very responsible, reliable way and help organizations achieve significant reductions in greenhouse gas emissions," says Creative Energy CEO Krishnan Iyer. "We help our clients build, renew and operate their energy infrastructure in a sustainable, reliable and affordable way."

Iyer commends Swedish for driving this large-scale change.

"They took the bold step of defining their sustainability goals to include decarbonizing their campuses and including



Swedish Health Services is continuing its journey in carbon reduction with major infrastructure upgrades.

that in their plans for the two new towers," he says. "Swedish took leadership, and we are seeing other health care providers follow that trend as well."

Swedish is already recognized for its environmental efforts, and all existing campuses have received awards for their energy- and carbon-reduction practices.

"Our mission is to improve the health and well-being of every person we serve," Denney says. "That doesn't just include the delivery of medical care, but [also] creating a healthy environment by doing our part." // BY BRIAN JUSTICE

## CHECKLIST

CODES+STANDARDS



### New emergency management standards in effect

Effective July 1, new and revised emergency management (EM) chapter standards are now applicable to all Joint Commission-accredited hospitals and critical access hospitals. The Joint Commission undertook a thorough analysis and rewrite of the EM chapter. The current EM chapter standards and elements of performance (EPs) EM.0.01.01 through EM.04.01.01 have been deleted and replaced by new EM chapter standards and EPs, EM.09.01.01 through EM.17.01.01. Other related changes for hospitals and critical access hospitals resulting from the EM project include a new EC.02.05.07, EP 11; a revision of EC.02.06.05, EP 1; a revision of Standard LD.04.01.10; and the deletion of LD.04.01.10, EP 1.

#### MORE ONLINE

For links to these reports, log on to [HFMagazine.com/checklist](http://HFMagazine.com/checklist)

### CMS amends ambulatory surgical center final rules

The Centers for Medicare & Medicaid Services (CMS) published several final rules amending the ambulatory surgical center (ASC) Conditions for Coverage. CMS made revisions to the regulatory tags and interpretive guidelines. It also is making clarifications and technical corrections to other guidance areas based on stakeholder feedback, including minor, non-substantive edits to Exhibit 351. Two of the clarifications are: separation of ASCs when located in a building that is shared with other entities, and applicability of ventilation standards for operating rooms. For additional information, see S&C Letter QSO-22-16-ASC.

### Foundation releases findings from door gap study

The Fire Protection Research Foundation, part of the National Fire Protection Association, released its report "Fire door experimental testing to study the influence of door gaps around swinging fire doors." The report shares results of experimental testing of the effect that door clearances might have on the performance of a fire door assembly. The project was divided into two main sets of experimental testing. The first part included generic full-scale fire door testing with assemblies in compliance with NFPA 80, Standard for Fire Doors and Other Opening Protectives, plus one test with bottom door gap dimensions as specified in NFPA 252, Standard Methods of Fire Tests of Door Assemblies. The second part involved full-scale fire door testing of certain generic fire door assemblies with a door gap dimension larger than NFPA 80 standards.

### CMS guidance on emergency management exercises

The Centers for Medicare & Medicaid Services (CMS) provided expanded guidance on exercise exemption based on a facility's activation of their emergency plan. The additional guidance clarifies that the exemption only applies to the next required full-scale exercise (not the exercise of choice), based on the facility's 12-month exercise cycle, which is determined by the facility (e.g., calendar, fiscal or another 12-month time frame). The guidance was provided in response to many of the response activities associated with the COVID-19 public health emergency. For specific examples on the application of the exemption, see CMS S&C Letter QSO-20-41-ALL REVISED 05.26.2022.

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## New ASHE staff member brings deep experience

**Leah Hummel**, AIA, CHFM, CHC, the American Society for Health Care Engineering's (ASHE's) new senior associate director of advocacy, discusses her roots in ASHE and the North Dakota Healthcare Engineering Society as well as her past positions at The Joint Commission (TJC) and as a state codes official.

### What drew you to the position of senior associate director of advocacy for ASHE?

I applied for this position because I saw it as an opportunity to make a bigger impact. I have seen first-hand the influence that ASHE has in the health care field. I have held a variety of roles all dedicated to improving the health care environment, including design, planning and construction, and enforcing codes and standards both at the state level and with an accrediting organization. Our work in health care facility engineering is greatly influenced by codes and standards, which exist for the safety of patients, staff and visitors in our facilities. I look at this position as an opportunity to further impact what those codes say, and to give back to the field.

### What will be your responsibilities in your new position?

Together with the rest of the advocacy team, I will work on regulatory issues. I will serve on code committees such as with the National Fire Protection Association (NFPA), the Facility Guidelines Institute (FGI), International Code Council and ASHRAE to represent ASHE members in support of the work they do behind the scenes for patient care. I will communicate with members to learn about the issues that are affecting them, and how we can help them. I will continue to learn and share that knowledge with others.

### How involved were you with ASHE prior to accepting your current job and what were your overall impressions of the group and its members?

I joined ASHE in 2006 when I first began working as a facilities architect for a health care system. New in my role, I had so many questions and needed guidance and resources. I was incredibly lucky to be part of a team that fostered continuous learning and development. I attended the PDC Summit, which was very relevant to my job duties.

Also, involvement in ASHE at the regional level was encouraged by my peers. The Region 6 conference was a great experience because it was attended by many of our team members, including designers, contractors, subcontractors and more. I think it helped to reinforce

IMAGE COURTESY OF LEAH HUMMEL

that we were all on the same mission — doing what was best for the patient. I loved learning from the ASHE faculty and speakers. Many of the challenges that we encountered, others had dealt with before, and I feel grateful that I was able to learn from their experiences.

### **What were your responsibilities at TJC and what lessons about hospital facilities management did you take away from that position?**

I started out as an intermittent Life Safety Code surveyor, while working simultaneously as a health facility construction plans reviewer for the department of health in my home state. I surveyed hospitals, critical access hospitals and ambulatory surgery centers for compliance with the accreditation standards, primarily in life safety, environment of care and emergency management. I loved interacting with those in the field, getting to see a wide variety of facility types and seeing best practices.

I then joined TJC's Standards Interpretation Group, where I reviewed survey reports, taught courses and webinars, and was responsible for answering questions from surveyors and accredited organizations on code compliance. In this position, I really learned how important the exact wording of the code is, because decisions can come down to a single word and how it is defined sometimes.

Compliance is a big piece of facilities management and it's important that facilities dedicate the resources needed to get it right. Understanding the relationship between the Centers for Medicare & Medicaid Services and the accrediting organizations has also been very helpful.

### **Did your experience as a state authority having jurisdiction open your eyes to any issues you didn't consider when you were working in a design firm?**

While doing plans review, I had to dig deep into the FGI *Guidelines*; NFPA 101®, Life Safety Code®; NFPA 99, Health Care Facilities Code (including all the referenced publications); and the ASHRAE ventilation standards, going line by line as I evaluated the construction documents to see if they were compliant. This was a great way to learn the code.

## THE LEAH HUMMEL FILE

### CV

- Senior associate director of advocacy at ASHE, Chicago.
- Associate director of engineering, Standards Interpretation Group, The Joint Commission (TJC), Oakbrook Terrace, Ill.
- Life Safety Code surveyor, TJC.
- Plans reviewer/construction inspector, North Dakota Department of Health, Bismarck, N.D.
- Architect for Altru Health System, Grand Forks, N.D.
- Architect and intern architect, EAPC Architects Engineers, Grand Forks.

### EDUCATION

- Bachelor of Architecture, North Dakota State University.
- Bachelor of Science in environmental design, North Dakota State University.
- Certificate in Health Administration, University of North Dakota.

### CURRENT AFFILIATIONS

- American Institute of Architects.
- International Code Council.
- National Fire Protection Association.
- ASHRAE.

### ACCOMPLISHMENTS

- Certified Healthcare Facility Manager.
- Certified Healthcare Constructor.
- Past president of North Dakota Healthcare Engineering Society.

Previously, I had been focused on the architectural aspects of a facility, leaving the utilities to the engineers. But, with plans review, I had to learn and apply all of it, whether it fell under the category of architecture or engineering. I really gained a better sense of how it all works together, whether it be life safety features, essential electrical systems, medical gas systems, plumbing or ventilation to keep patients and other occupants of the health care facility safe.

### **What projects were you involved in during your time as a practicing architect and did anything there lead you to become more involved in codes issues?**

My first job out of college was for a design firm that worked on a wide variety

of construction types, including commercial, multifamily residential, education, hospitality, industrial, and of course health care. I was lucky enough to get some experience working in all different sectors. I was a self-proclaimed “code junkie” from the very start of my career, doing the research on what was required and what was allowed, etc. It was there that I was first introduced to the International Building Code and the FGI *Guidelines for Design and Construction of Health Care Facilities*. In some ways, codes can be limiting. But I found them super helpful as a guide to lead you to the best solution for your client.

### **Why did you decide to move to focus on health care projects?**

In 2005, my twin sons were born three months premature and had to spend the first three months of their lives in a neonatal intensive care unit in a city that was about 75 miles from home. I spent all day, every day there with them until they could come home. Previously, I had worked on lots of different project types but, from that point forward, I only wanted to work in health care. People who work in health care are dedicated to serving others and I wanted to help others the way we had been helped. I have tremendous appreciation for all the work that goes on behind the scenes in support of patients and those who work directly with patients.

### **What message would you like to give to ASHE members as you settle into your new job?**

Thank you for the work that you all do to care for others. At the end of the day, everything we do is for the patient. I'm very excited to be part of the ASHE team. If we, especially those of us who work in advocacy, can do anything to help you in support of that mission, please let us know; we are here to support our members. If there is education that you think would be helpful, issues you would like us to advocate on your behalf for, or messages you would like us to help get out, we'd love to hear from you. **HFM**

**Michael Hrickiewicz** is editor-in-chief of *Health Facilities Management* magazine.

# SOLUTIONS

ON OUR RADAR



ON OUR RADAR



**1 CLEAN FINISH //** Evero Matte is a fresh new quartz option with a stone-like appearance for commercial hand-washing basins. It is highly resilient, and will resist stains and cracks. It is also nonporous and seamless — inhibiting mold and bacteria growth — for a healthier and more hygienic hand-washing experience. GreenGuard certified, Evero Matte requires no external finishing operations, showcasing a natural finish. **Bradley Corp.**

**2 WALK ON BY //** The Top Notch and Top Shelf collections offer variety to health care flooring. Top Notch offers a dynamic, geometric style, layering planes and circles of variegated lines, while Top Shelf delivers an organic linear pattern that echoes the gentle striations of sedimentary rock. Both were designed with a 3.0 texture appearance retention rating. **Mannington Commercial**

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**3 QUICKLY FOUND //** The KVM-over-IP solution allows nurses, doctors, technicians and IT staff to access medical devices from various locations in a hospital. The solution provides a cost-effective means for connecting in-room patient monitoring equipment to the centralized display points within a hospital — such as nurses stations. **Raritan**

**4 FULL COVERAGE //** The Kaivac Misting System mists EPA-registered disinfectants, sanitizers, cleaning solutions and even tap water onto all types of surfaces, including high-touch and hard-to-reach areas. Connecting directly to the KaiVac 1750 No-Touch Cleaning System, the Kaivac Misting System delivers an ultra-fine mist of 60–80 microns. The system helps ensure effective infection control with one all-purpose machine. **Kaivac**



**1 SAFE AND SECURE //**

The Concealed Weapons Detection System is engineered to detect a wide range of threats like handguns and rifles. The walk-through metal detector system uses multiple sensors to detect a threat, as well as identify and then ignore harmless personal items. The sensors include magnetometer, induction, LIDAR, thermal, visual camera and artificial intelligence technologies.

**Athena Security**

**2 CHECKING IN //**

The Vendormate Kiosk is an integrated mobile app and kiosk solution that overlays infection control with credentialing requirements to allow for improved facility safety and security. This helps organizations solve the credentialing challenges brought on by COVID-19 and prepare for future compliance and infection control protocols to meet the dynamic environment.

**Global Healthcare Exchange LLC**

**3 SIMPLE KEY //**

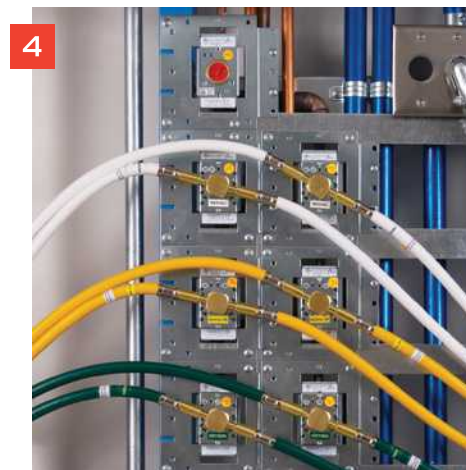
The KL1000 G3 is a flexible solution, ideal for staff rooms and storage areas, providing immediate, convenient keypad access without the need for cards and keys, and meeting the needs for less person-to-person contact. It is enhanced with a key override function that allows key holders to access lockers in the event of a forgotten code or during an emergency, increasing flexibility for managers, staff and guests.

**CodeLocks Inc.**

**4 BETTER VISION //**

The Illustra Pro Gen4 cameras offer artificial intelligence-enabled edge solutions to help users respond more quickly and efficiently to incidents. Users can leverage the camera's built-in capability for object classification, which can narrow events to classes such as a person, car or bus. It also gives users the flexibility to choose between distributed edge and cloud architectures and on-premise surveillance system scenarios.

**Johnson Controls**



**1 EXPANDED LINE //** MediTrac has added to its corrugated medical tube family with a 2-inch diameter option. Unlike traditional copper tubing used for medical gas distribution, MediTrac installs quickly with one continuous length from the gas source to a terminal device. MediTrac can be used in new, renovated or retrofitted medical or care facilities. The flexible medical gas system (including piping and fittings) has been extensively tested. **Omega Flex Inc.**

**2 LESS MESS //** This oil-free scroll medical air system is compliant with NFPA 99 and designed and manufactured with ISO 13485 processes. New fittings and connectors reduce potential leak points and help conserve energy. The system comes with TotalAlert embedded controls, enabling users to network the scroll system with alarm panels through the ethernet. **Beacon Medaes**

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Learn more about these products at [www.HFMmagazine.com/solutions](http://www.HFMmagazine.com/solutions)

**3 NIMBLE SERVICE //** The 2PS Series compressors offer a compact, reliable and cost-effective means for small scale high-pressure cylinder filling. With 2PS, users simply refill cylinders on-site via the compressor, saving time, money and service requirements in the process. Ideal for critical medical applications, the 2PS series handles inert, dry gas. **RIX Industries**

**4 FLEXIBLE GROWTH //** The NuLook Flexwall system is an acuity-adaptable prefabricated system that allows for flexibility while simplifying construction. It comes with vertical sections where critical medical gas connectors are located. Components have optional vertical and/or horizontal rail systems and reveals, as well as 3D wrap-finished front panels attached. All medical gas piping is hard-piped and brazed to a single point of connection. **Amico Corp.**

These product descriptions have been condensed from information supplied by manufacturers, representatives and distributors. They are for informational purposes only. Product inclusion should not be construed as an endorsement by *Health Facilities Management* magazine, ASHE or the American Hospital Association.

# Renovation brings benefits to the surface

**S**anford Heart Hospital, located on the campus of Sanford USD Medical Center in Sioux Falls, S.D., opened in 2012 as a dedicated heart health care facility. By 2020, higher-than-expected growth in demand for heart hospital services called for an expansion.

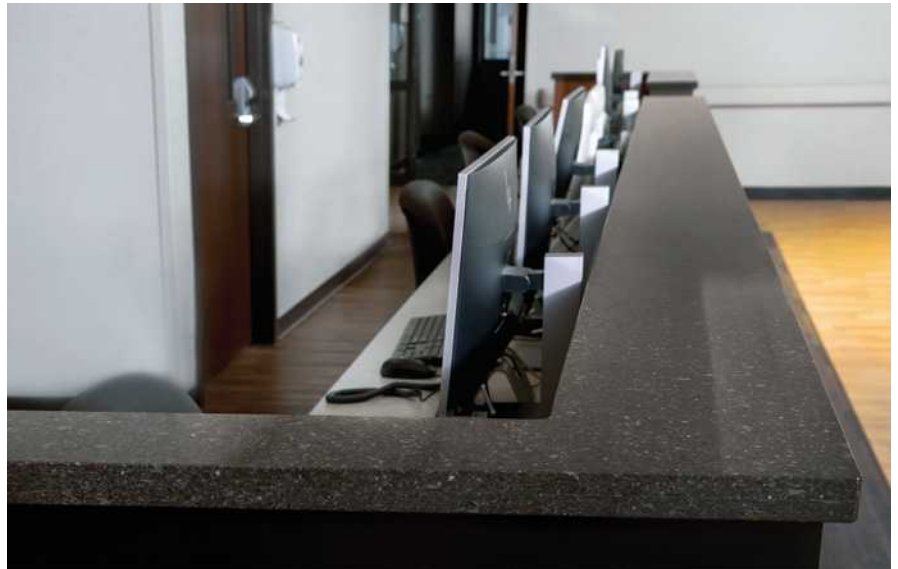
Fortunately, hospital leadership anticipated significant growth and built a designated space for future expansion. Since 2014, Sanford's overall admissions numbers have increased by 32%, emergency room visits by 16% and catheterization lab visits by 26%.

Adding 26,058 square feet within the existing footprint, an addition had to blend well and be consistent with the existing structure, and also needed to improve upon the overall durability, longevity and aesthetics of that space.

The solid surface material used in the existing structure exhibited scratches, wear and staining from daily use of hospital-grade cleaning products and disinfectants. The undermount sink areas were prone to harboring germs and bacteria. The team also wanted more storage for patients' personal items and medical supplies in patient rooms that would be functional, accessible and easy to clean.

The goal of the facilities managers was to provision spaces within the hospital that were comforting, calming and healing. At the core of Sanford's decision-making process was mitigating risk and finding opportunities to leverage materials that were more suitable to withstanding the demands of the hospital while supporting patient health and wellness.

Sanford turned to one of its longtime partners, Cambria, based in Le Sueur, Minn., for support in solving these challenges. Cambria would supply a product that not only would perform well, but also would elevate the look and feel of the space while staying true to the original specifications and enabling design consistency between patient rooms.



Sanford Heart Hospital used lessons learned from its previous facility to design a new space, complete with natural quartz surfaces that were durable and easy to clean.

## Interiors challenge

**NEED** // Solid surface material

**SOLUTION** // Cambria natural quartz surfaces

**RESULT** // Improved durability and hygienic properties

"We were really looking for a turnkey solution and already recognized the superiority of the Cambria product from our previous experience with quartz in non-clinical spaces," says Sanford Heart Hospital Construction Project Manager Nathan Kraft, who has been with the Sanford organization since 2006. "We sent the project specifications with our cleaning solutions and hand sanitizers to Cambria.

Testing was done to ensure overall performance and the compatibility of Cambria with our cleaning protocols."

In a 24/7 health care environment, where safety and infection prevention are of the utmost importance, Cambria's nonabsorbent, durable, natural quartz surfaces proved to be the right solution. The surfaces

withstand myriad disinfecting cleaners that meet the Centers for Disease Control and Prevention's "Guidelines for Environmental Infection Control in Health-Care Facilities."

"We had peace of mind knowing it would hold up better, require less maintenance and last longer," Kraft says "Using a product such as Cambria is the

sustainable choice, just knowing about its technical performance, durability and lifespan."

The Sanford design team specified Cambria in spaces such as charting and nurses stations, patient toilet room vanities and hand-wash stations in patient spaces. Each Cambria design was chosen to coordinate with existing finishes.

Cambria's corporate services team provided a turnkey solution for the hospital, which included estimation, fabrication, installation, project management and advice on technical inquiries. The company fabricated seamless integral sinks, which eliminated the gap between the sink and the counter, thereby preventing the growth of mold and mildew. The company also constructed built-in quartz shelving for patient room storage, enabling easy access and cleanliness.

Sanford Heart Hospital leadership took key learnings from its original facility to optimize the buildout of the new spaces to enhance the patient experience. The final result: Cambria helped improve the Sanford facility by providing high-performing quartz surfaces, a durable and hygienic solution that provides a beautiful aesthetic that elevates the patient experience. **HFM**



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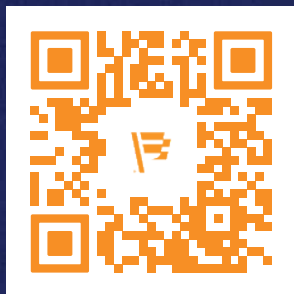
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# What ‘Occupant Safety’ Means to Health Care Restoration Teams

Hospitals can be stressful places. Patients, visitors and health care employees are all focused on helping those in need get better. For doctors and nurses, it means providing the best care possible for their patients while protecting guests and colleagues from the increased risk of infection or disease. Health care restoration professionals share this sentiment. In our industry, this is referred to as “Occupant Safety” and is the most important goal of any project.

## Understanding Occupant Safety from a Restoration Company’s Point of View

For First Onsite, Occupant Safety is the highest priority when working within a health care facility, and it’s just as important to the facility that the work is being performed in. Much as doctors and nurses work with patients, restoration professionals work with health care facilities. Just as a patient’s health can turn, a building can unexpectedly be damaged. Often, the health of a building — its integrity — will dictate what procedures can and can’t be performed by health care providers within a facility. If building damage is untreated, that will likely cause further damage, making it much harder for doctors and nurses to maintain safe and efficient operations in the space. While our work is different, we have Occupant Safety as a common and reachable goal.

Regulatory agencies such as The Joint Commission, CDC and EPA have created standards and guidelines for how construction projects are to be handled in a health care facility. Government agencies such as the Centers for Medicare & Medicaid Services, part of the U.S Department of Health and Human Services, monitor patient experience and readmittance rates for the explicit purpose of protecting occupants from hazards in a facility. But those hazards are not always obvious. That is why it’s important that the restoration contractor work with the facility to prevent situations that could cause HAI’s.

## How Compassion and Empathy Play a Role in Restoration

Due to COVID-19, the stress on health care facilities has increased exponentially. Buildings have been completely closed to visitors in attempt to slow the spread of infection. Nurses work long hours, are spread thin and have experienced an emotional toll that has caused mass resignations. There is a shortage of caregivers.

As a partner to health care clients, restoration industry professionals like First Onsite understand the importance of not only addressing building damage but also working with the facilities’ employees so we can provide the best service. This means having open and honest conversations about how we can assist with infection control and prevention.

One of the most eye-opening meetings we have had involved a small group of nurses at a hospital in the Southeastern U.S., where COVID-19 was decimating the elderly population, and the hospital had been overrun with new patients. During our conversation, one of the nurses asked that we, as health care restoration professionals, step out of our shoes and into hers. She asked that we reflect on the challenges that she and her colleagues deal with every day and that we do whatever we can in our power to assist in alleviating those challenges. She was asking us to have compassion and empathy for her staff and their patients.

While the work we do is about the health of the building, the perspective of our work goes beyond that. At First Onsite, when we say we work to keep your occupants safe, that means that we perform our work to the highest standards of quality while considering the risks that doctors, nurses, patients and guests experience with compassion and empathy. That way, occupants within a health care facility can focus on what’s important to them: helping those in need get better.



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# ADVOCACY

**Uncovering the best ways to enhance  
pandemic preparedness and sustainability**

BY ED AVIS

**H**ospital facilities managers faced countless challenges during COVID-19, and now the American Society for Health Care Engineering (ASHE) and other organizations are striving to make sure that the next time a pandemic hits, it won't be quite as tough. How? By uncovering the lessons of COVID-19 in white papers, reports and other documents.

But, for ASHE, a key part of that "lessons-learned" process is ensuring that these documents don't create new burdens for health care facilities professionals and that the code changes that result from the process do not conflict with each other. ASHE advocacy staff is accomplishing those goals by sitting on various committees that are working on these documents and by monitoring the results closely.

"We are helping these committees make the best possible suggestions from the facilities perspective," says Jonathan Flannery, MHSA, CHFM, FASHE, FACHE, senior associate director of advocacy for ASHE. "And, as far as code unification is going, our efforts are doing very well. We've put together a crosswalk that compares the National Fire Protection Association (NFPA) codes, the International Code Council (ICC) codes and the ASHRAE codes. And we add in the Centers for Medicare & Medicaid Services (CMS) standards. We feel right

now that if the latest edition of each code was adopted, we'd be right around 98% unified."

While COVID-19-related issues are still on the forefront, ASHE advocacy staff also is keeping a focus on code over-reach, sustainability and other issues.

### **COVID-19 lessons**

Numerous efforts are underway to put into writing the lessons of COVID-19. For example, the ICC is preparing an appendix to the International Existing Building Code that aims to provide guidance related to temporary health care occupancies. ASHE's Senior Associate Director of Advocacy Leah Hummel, AIA, CHFM, CHC, who joined ASHE in February after seven years at The Joint Commission, is on the committee assisting with that appendix.

"The COVID pandemic has really brought to the forefront the need for temporary facilities to be used for health care in response to needing additional surge capacity within our facilities," Hummel says. "But organizations were wanting to open up these temporary facilities in buildings or portions of buildings that weren't really designed for that use. And so, organizations were challenged by their authorities having jurisdiction (AHJs) to meet

their requirements for health care that are pretty stringent and that these buildings weren't necessarily designed for. So, by having some levels of safety defined or maybe eased up in some cases while still providing a level of safety, the changes will really help organizations — not just in this pandemic, but in other situations in the future where they will have the need for surge capacity."

Other efforts to capture COVID-19 learnings are underway from NFPA, ASHRAE and others. Each of these groups is focusing on its area of specialty, which means there could be overlap or conflicting recommendations. To help alleviate that, the ICC has created a task force to examine all the efforts and create one holistic document that incorporates the best ideas from each.

The ICC's task force formed in December 2020 in conjunction with the National Environmental Health Association (NEHA). The task force includes 24 members representing a broad cross-section of the industry, including individuals from the American Institute of Architects, the National Association of Home Builders, ASHRAE,

## Writing a procedural document for ANSI/ASHRAE/ASHE 170

**A**merican National Standards Institute (ANSI)/ASHRAE/American Society for Health Care Engineering (ASHE) Standard 170, Ventilation of Health Care Facilities, is widely used by facilities managers working to maintain their systems. However, it is a design standard, not an operational standard, which limits its use in that regard. An ASHE/ASHRAE work group began efforts late last year to remedy that situation by creating an operational standard based on Standard 170.

Jonathan Flannery, MHSA, CHFM, FASHE, FACHE, senior associate director of advocacy for ASHE, leads the working group. He explains that an operational standard based on Standard 170 will provide more flexible parameters for several real-world issues. For example, Standard 170 specifies that the temperature of an operating room be 68 to 72 degrees, which is manageable from a design standpoint. But, in day-to-day operations, that range could easily be exceeded.

“A surgeon may want it cooler or, if you have burn victims in there, the space needs to be hotter,” Flannery says. “When you’re doing surgery on burn victims, you want to have the room around 85 or 90 degrees, actually. So that’s why we’re in the process of writing an operations guide.”

Another reason the committee is developing the operational standard is that the Occupational Safety and Health Administration (OSHA) is seeking to adopt ANSI/ASHRAE/ASHE Standard 170 as a retroactive standard for the safety of health care workers, explains Chad Beebe, AIA, CHFM, CFPS, CBO, FASHE, deputy executive director of ASHE.

“We are opposed to OSHA’s adoption of ASHRAE 170 because it is not an operational standard, it’s a design standard,” Beebe says. “It’s not intended for an organization to maintain exactly to those standards 100% of the time. For example, there might be a temperature called out for a certain room, or a certain number of air changes, but anything in the environment can change that at least momentarily.”

Beebe says it would be preferable if OSHA did not use any version of Standard 170 as its standard, because that would mean one more adoption that would need to be coordinated to keep unified with the Centers for Medicare & Medicaid Services’ Conditions of Participation. But if OSHA persists in that effort, having it adopt an operational standard instead of a design standard makes more sense.

Flannery predicts the work group will have a draft ready for public review by summer 2023. ■

“They are figuring out how all these things intertwine when you’re looking at a building as a whole. Because they all tie together, you can’t just change something without it potentially snowballing somewhere. That’s what the task force was targeted with, trying to look at this with a holistic approach.”

The second phase, which has been underway since the end of 2021, is developing best practices from all the disparate pieces. Each working group is reporting to the body with their recommendations and, by the end of 2022, those should all be assembled into one document, Cika says.

The final phase will be to incorporate those recommendations into the ICC codes as appropriate.

“The end goal is to look at all these best practices and determine if the building codes need to be changed or modified based on our findings,” Cika explains.

“So, we will, as the third phase, take all of our learnings and come up with lists of proposed changes for the building codes as we go through our code development process for 2024, which will actually be for the codes that are published in 2027.”

### Preventing overreach

The creation of these documents regarding pandemic situations will help AHJs decide if proper precautions are being taken when temporary structures are built or other pandemic-related actions are taken, of course, but ASHE advocates are ensuring that the documents do not create needless burdens.

For example, one concept in the ICC appendix on temporary health care occupancies relates to the structural durability of tents, modular buildings and other structures that were commonly erected in hospital parking lots during COVID-19. John Williams, an executive director at the Washington State Department of Health, who chairs the ICC’s Committee

the National Center for Healthy Housing and several others. ASHE is represented on the committee by Flannery and Chad Beebe, AIA, CHFM, CFPS, CBO, FASHE, deputy executive director.

The group’s first task was to review the pile of documents currently available, explains Jim Cika, director of

plumbing, mechanical and fuel gas technical resources at ICC. The 24 task force members formed four working groups – architectural/structural, fire service, mechanical-plumbing-electrical and remote operations.

“This task force is attempting to look at the situation holistically,” Cika says.



“We are helping committees make the best suggestions from the facilities perspective. And, as far as code unification is going, our efforts are doing very well ... if the latest edition of each code was adopted, we’d be right around 98% unified.” — **Jonathan Flannery**



“When we do our advocacy, we’ll continue to look at ways that we can improve the codes to acknowledge newer technologies in a quicker fashion. These will often address advancements in sustainability.” — **Chad Beebe**

for Healthcare, explains that the draft of the appendix was revised to address the on-the-ground reality of such structures.

“Temporary structures are typically rolled out quickly, and there is always some risk of an additional environmental impact like a windstorm or an earthquake aftershock that could compromise the structure,” Williams says. “While it’s a good idea to interrogate the durability of those temporary structures, there also needs to be a conversation about what realistically happens if a tent falls down. There would be immediate consequences to the people inside of it, but if making the tent or modular building more robust prevents it from being deployed within the time frame needed, we have a gut check to do. We need to strike a balance between being safe enough and meeting the needs of the situation.”

Another example of an effort to ensure that requirements are manageable relates to a proposed requirement in the ICC appendix that the means of egress of a temporary structure meet the requirements of a normal health care occupancy, Flannery notes. That would completely wipe out the potential use of hotels as temporary health care facilities, because hotel hallways are typically much narrower than the 8 feet required by code.

“We were able to get that changed to say that you wouldn’t reduce the means of egress of the existing facility,” Flannery says. “So, if the existing egress of that facility was not as good as a hospital, it doesn’t matter, as long as you don’t reduce the egress opportunities.”

Another issue ASHE is pushing back on is a proposed requirement to include carbon monoxide (CO) detectors in health care facility sleeping rooms. This idea is being put forth for the

International Fire Code. The scenario is that a CO buildup could indicate an increased risk that the ventilation is not adequate. Flannery explains that ASHE opposes this provision because there is no evidence that CO is a problem now, and since health care sleeping rooms are required to be well ventilated already, the increased requirement would not provide a reduction in risk.

Beebe notes that obviously ASHE is not opposed to a life-saving device, but there’s no evidence that CO detectors in hospitals would save lives.

“It needs to be in a scalable approach because, in many hospitals, we wouldn’t have fuel-burning appliances that would give off carbon monoxide on the patient floors or attached to the sleeping areas,” Beebe says. “So, the whole concept of requiring carbon monoxide detectors in every single patient room is an overreach. I think the money could go to better patient care options over that.”

### **Improving the codes**

In addition to preventing code overreaches, ASHE has been advocating to improve existing codes and unify them as appropriate.

For example, Beebe reports that an error was discovered in the 2018 edition of NFPA 99, Health Care Facilities Code, that technically limits health care facilities from using oxygen above the fifth story of a structure. The section in question is called “Maximum allowable quantity of hazardous materials.” Because oxygen is an oxidizer, it is considered a hazardous material, and the regulation states

that the amount of hazardous material allowed above the fifth floor drops by 25% per floor.

“That limitation would, of course, basically eliminate the ability to do health care on higher floors because we depend on oxygen too much,” Beebe says.

Beebe says ASHE advocacy staff is trying fix this error for the 2024 edition, but he also hopes to affect a correction to the 2018 and 2021 editions. CMS is still using the 2012 edition, so the rule doesn’t apply to hospitals yet, but it’s unknown which edition CMS will adopt next.

Getting the situation changed is not a slam dunk, Beebe says.

“The NFPA 99 committee feels there’s a hazard that exists, but we have not seen any data that would suggest that there is a hazard,” he says. “We have a long history of medical gases being used throughout high-rise floors without incident in the U.S.”

A code alignment issue that ASHE advocacy staff is dealing with regards the usage of alcohol-based hand rubs (ABHRs) in business occupancies. ABHR usage went through the roof during COVID-19, but building codes prohibit it in business occupancies because it supposedly could explode during a fire.

Flannery notes that computer modeling has revealed that ABHR dispensers will not blow up in a fire and, in fact, they don’t really even catch fire. Additionally, there is no documented case of

## TJC resumes survey activity with new occupancy standards

**T**he Joint Commission (TJC) has resumed its health care facility surveys in practically the entire country, reports Jonathan Flannery, MHSA, CHFM, FASHE, FACHE, senior associate director of advocacy for the American Society for Health Care Engineering (ASHE). TJC paused surveys during COVID-19. These surveys are the first since the organization released new standards related to business occupancies last summer.

Not surprisingly, the new standards have raised some questions. “A lot of questions have come up from our members about application of the new TJC standards,” says Chad Beebe, AIA, CHFM, CFPS, CBO, FASHE, deputy executive director of ASHE. “We know that TJC is revising those standards, and we look forward to the requirements becoming more clear.”

Leah Hummel, AIA, CHFM, CHC, senior associate director of advocacy at ASHE, was employed by TJC when the new standards were issued and she worked on some of those revisions, which have not yet been published.

“For example, there is an element of performance regarding protection of hazardous areas in business occupancies,” Hummel explains. “Within the Life Safety Code, the requirements for hazardous areas in business occupancies are a little bit unique compared to health care occupancies in that, if the building is sprinklered, you don’t have to have the room protected with a smoke partition and a self-closing door. But the wording of TJC element of performance requires that the room, even if it is sprinklered, also is protected with smoke partitions and a self-closing door. So that was one of the elements of performance that was questioned, by not just ASHE but also other organizations. So, it needed to be revised.”

Hummel praises the thoroughness of the process of revising TJC standards: “Having been on that side of the fence and really seeing what goes into evaluating a question from an organization or a clarification that’s submitted after survey, I have a lot of appreciation for the complexity of those decisions and really having to parse the wording of the code and understand what’s required by the Centers for Medicare & Medicaid Services. It’s complicated, and there’s a lot that goes into it; it really requires a thoughtful evaluation and response.” ■

a fire made worse by ABHR. Health care occupancies are already permitted to have ABHR dispensers, and aligning other codes to allow ABHR usage in business occupancies simply makes sense.

“We worked with several other folks and made changes in the International Fire Code and the International Building Code, and those same groups work with NFPA for the Life Safety Code,” Flannery says. “So, in the end, we’ll have it all aligned and the codes will allow for proper ABHR usage anywhere.”

### Sustainability is key

COVID-19-related issues are not the only focus of ASHE advocacy staff. Another key issue is sustainability, particularly the drive to decarbonize health care buildings. This refers to reducing the amount of carbon-based fuel these buildings use.

Naturally, ASHE supports decarbonization efforts thoroughly, but advocacy staff

works to make sure patient needs are not jeopardized in the drive to decarbonize.

“ASHE supports the changes health care facilities make to their utilities, infrastructure and their facilities to reduce carbon usage, but it’s important that they still support patient safety and don’t go so far in the other direction that patient safety is impacted,” Hummel explains. “For example, we need to make sure hospitals still have ventilation that ensures infection control concerns are met, water systems that effectively limit the growth of Legionella or other waterborne pathogens, and electrical systems that provide the redundancy that’s needed to make sure that all of the things that are required to be on essential power, like life safety components and critical utilities and equipment, may remain operational whenever a facility is occupied. We want to work out some of those challenges and really provide a blueprint

for organizations to meet the challenges to decarbonize, but also meet the requirements for patient care.”

As with other issues, ASHE is helping the decarbonization effort by contributing to committees focusing on the topic. For example, several ASHE representatives are working on a program of the National Academy of Medicine called the Grand Challenge on Climate Change, Human Health and Equity.

The Grand Challenge has four objectives: to communicate the climate crisis; develop a roadmap for systems transformation; catalyze the health sector to reduce its climate footprint; and accelerate research and innovation on the topic.

Kara Brooks, MS, LEED AP BD+C, ASHE’s senior associate director of sustainability, sits on two subcommittees of the Grand Challenge — one focusing on policy financing and metrics, and one on supply chain and infrastructure.

“The collaborative is kind of a public-private partnership,” Brooks says. “They are looking at lots of different areas within health care and learning what can be done. They’re really digging into all aspects.”

Brooks also serves on an ASHRAE work group on decarbonization. She explains that the two groups have somewhat different focuses on the same topic. “ASHRAE is looking at the planning and design of health facilities, while the National Academy of Medicine effort is higher level; it’s really trying to inform policy and regulations,” she says.

### Long-term focus

As noted above, ASHE advocacy staff members have full agendas on a wide range of issues. However, sustainability is an issue that will outlive COVID-19 and continue to affect health care facilities perpetually, Beebe predicts.

“Sustainability is going to be a big factor in everything that we do going forward,” he says. “When we do our advocacy, we’ll continue to look at ways that we can improve the codes to acknowledge newer technologies in a quicker fashion. These will often address advancements in sustainability.” **HFM**



**Ed Avis** is a Chicago-based freelance writer and frequent contributor to *Health Facilities Management*.

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Facilities managers must assess the entire property and layout of a design, including heliport access.

Nature. In operating a health care facility, there are several factors related to the building envelope besides the building itself.

Facilities managers must assess the entire property and layout of a design including surface parking, parking garages, canopies, ambulance entrance access, Americans with Disabilities Act accessibility, heliport access and Federal Aviation Administration regulations related to the heliport.

Additionally, they should consider roof membrane and roof drain maintenance, water intrusion points such as exterior sliding doors, unsecured items outside that could potentially turn into projectiles from excessive wind gusts, windows and larger glass walls, and areas prone to flooding conditions from runoff or excessive rain. The list is endless, depending upon the geographic location and surrounding terrain.

The building envelope is the physical separator between the conditioned and unconditioned environment of a building that also provides resistance to air, water, heat, light and noise transfer. Ensuring that the building envelope is functioning properly is an important maintenance activity, yet it is even more important when considering the impact of severe weather events.

Ensuring that roofs don't leak and that the envelope is keeping extreme cold and heat at bay as designed and constructed is best managed through a maintenance plan. This plan should include regular visual inspections as well as scheduled specialty inspections such as infrared surveys and detailed inspections of system components.

To combat building envelope issues, managers should assess whether the tools

and supplies are on hand to mitigate any damage that might be associated with a severe event. Examples include barricade material, sandbags, plastic sheeting material, shop vacuums or water extraction equipment, ice melt and sand for walkways and parking lots, floor fans, portable cooling or heating units and plywood, as well as other materials needed to address impacts from severe weather.

Landscaping often is overlooked as a factor in determining vulnerability to the building envelope during severe weather events. But has the beautiful healing garden in the middle of the courtyard with a water effect been overlooked as a potential water intrusion risk when a tree falls from excessive winds and the retaining wall collapses? What about the patio furniture becoming projectiles during excessive wind downdrafts and gusts?

Evaluating the landscaping throughout the facility campus to determine potential severe weather impacts during all seasons is important to ensure that plans are in place to respond when events happen.

### Infrastructure systems

Health care facilities are served by numerous utility infrastructure systems and their related equipment, all of which are critical to providing patient care. This is why the Centers for Medicare & Medicaid Services requires utility management planning. One of the vital elements of utility management planning is to consider the safe operation, maintenance and emergency response procedures for these critical operating systems.

Thought must be given to what might happen if there was a sudden loss of any critical building systems, and what

workarounds or temporary solutions are available to get them back online during an emergency. Consideration should be given to, at minimum, the systems described below.

Additional systems may need to be considered based on an organization's specific situation. How could a severe weather event affect each of these systems, and what measures can be taken to help mitigate the impact and/or improve the response? Additionally, failure of any one component within each of these systems could ultimately result in a failure of the entire process, so consideration of specific components also may be necessary.

**Water and steam systems.** Water is not only an essential life-sustaining need for patients and staff but also is a vital component of many facility utility systems. Ensuring that water is readily accessible and that potable water is clean and available is vital, and this need can be magnified significantly during an emergency. Having a water management program in place is a required step to ensuring that water supply does not negatively impact patient care. Some of the vital systems that water impacts are:

- *Chilled water systems.* Thought must be given to what might happen to the chilled water system if the ability to provide makeup water to the cooling towers is impacted by an extended water utility disruption, or what might happen if a tower experiences damage from a severe storm.

Managers should consider the chilled water system as a multipiece system consisting of chillers, chilled water pumps, condenser water pumps, cooling towers, water treatment related to the chilled water system and the overall capacity of the system.

If any one of the single components fails, the system could fail.

- *Heating water system.* Heating water systems are closed loop systems and, as such, the required water makeup will be minimal compared to chilled water systems. Heating water systems also are multipiece systems consisting of pumps, heat exchangers, boilers and control valves.

- *Domestic cold water.* Loss of domestic cold water has a global effect on a facility. Not only is there potential to lose the

### ABOUT THIS ARTICLE

This is one of a series of monthly articles submitted by members of the American Society for Health Care Engineering's Member Tools Task Force.

## Coordinating emergency ops with hospital utility failure plans

In last month's "ASHE Tools" column, Jordan Plyler and Dave Dagenais provided an overview of the importance of the hazard vulnerability analysis (HVA) in emergency preparedness planning. As they reminded readers, an HVA is the foundational element used to develop a facility's plan to mitigate, respond to and recover from emergent situations.

While the HVA is used to help develop the emergency operations plan, it is often not used as the foundation for developing utility failure plans. This is because these plans are generally developed under the scope of utility failure without reference to the cause of the failure. Understanding that a "hiccup" in the essential electrical system could be a sign of a larger issue within the system that could impact patient care if it is not properly communicated is often overlooked in utility failure planning.

Taking a much broader view, including the information developed within the HVA, along with operational processes for the various utilities within a health care facility, is vital for the proper development of utility failure plans.

For more information on the development of comprehensive utility failure plans, readers can access the Compliance+Operations article, "Comprehensive utility failure plans," from the September 2019 edition of *Health Facilities Management* and available at [hfm magazine.com/articles/3761-comprehensive-utility-failure-plans](http://hfm magazine.com/articles/3761-comprehensive-utility-failure-plans). ■

*Sidebar by Jonathan Flannery, MHSA, CHFM, FASHE, FACHE, senior associate director of advocacy for ASHE.*

power plant, but also direct patient care infection control issues. It is important to establish relationships with the utility supplier for notification of boil water notices, loss of pressure or when utility maintenance is being performed on the system that might affect delivery.

- **Sanitary sewer systems.** Sanitary sewer events are commonly overlooked as a severe weather event, but what might happen if the utility downstream lift station loses power or is flooded and cannot handle demand? Can the facility manage if sewage starts bubbling up from manholes in the middle of the parking lot?

- **Steam systems.** Steam is a universal and powerful utility. Steam can be used to heat water, sterilize surgical instruments and provide warm air. The steam system is a critical component to maintaining the sterile processing department that supports surgical services.

- **Water softeners.** Water softeners treat the incoming utility water supply through the process of ion exchange, replacing the calcium carbonate ion for a sodium chloride ion. The ion exchange process allows for chelation of water on metal. This is a requirement to provide "critical water" in sterile processing for reprocessing of surgical instrumentation.

**Gas and oil systems.** Natural gas, propane and fuel oil are fuel sources that support emergency generators, food and nutrition services, heating hot water, steam boilers and air handlers.

During the winter storm of 2021, Texas facilities experienced outages of natural gas and shortages of diesel fuel deliveries as a direct result of power outages at fuel depots, or hazardous road conditions limiting the transportation of fuel delivery trucks.

Consideration of these fuels when developing emergency response plans is important.

**Medical gas systems.**

Medical gas systems are unique in the fact that every possible gas can be supported through bottles (except vacuum).

- **Medical vacuum.** Most medical vacuum systems are air-cooled package units. However, there are some vacuum systems that use chilled water for heat transfer. If a facility has a water-cooled unit, is there an alternative source of cooling media if the primary cooling source is lost due to a storm-related utility disruption?

- **Medical air.** Hospitals that produce medical air for patient support might want to consider a redundant electrical feed to support the equipment if the primary electrical branch circuit fails, or have an exterior emergency connection point with power capacity if a temporary compressor package is needed from a storm-related event.

- **Oxygen.** Oxygen systems can be liquid bulk systems, bottled or a combination of both bulk and bottled systems. Facilities managers should work with their supplier to ensure they have a properly sized tank and evaporator to handle demand. Some facilities have installed a connection point, much like an emergency oxygen supply connection, for its ability to connect a secondary reserve tank to support a facility until an emergency support source is located. Contrary to popular belief, emergency oxygen tanker trucks require some lead time to deploy.

**Fire systems.** Fire alarm and fire sprinklers are designed to alert occupants and suppress fires until emergency services arrive.

- **Fire alarm.** The fire alarm system consists of devices designed to detect and alert occupants of a building that a potential issue may be present. In the case of a major event, there might be a situation where water enters a device, causing a ground fault condition that will place the main fire alarm control panel in jeopardy and temporarily disabling that specific circuit for monitoring the space. It is best practice to have all primary point of contact information on the inside of the panel and also at a remote location for emergency response situations.

also at a remote location for emergency response situations.

- **Fire protection (sprinklers).** Sprinklers are designed to suppress, not extinguish, a fire. A facility may have several types of sprinkler systems, including

pre-action, dry, antifreeze, special hazard and, most commonly, wet systems. Fire sprinklers are dependent upon the public utility water source and delivery means. If a tornado strikes the water tower near a facility, the situation must be mitigated.

**Power systems.** Facilities are dependent upon reliable power sources to support the physical environment. Just how reliable is the public utility source,

RESOURCE

i American Society for Health Care Engineering members can access an Adverse Weather Checklist by logging on to [ashe.org/weather](http://ashe.org/weather).



Fire sprinkler systems are dependent upon the public utility water source and delivery means.



Synchronous gear for multiple generator sets is one of many items in the overall emergency power system to consider as a failure point.

and are there any potential transmission issues that might be a risk to the facility? Facilities managers should partner with the local utility provider to test transmission lines and utility alternate feeds and substation maintenance.

It is imperative to test emergency power systems at a regular interval to ensure functionality in the event of an emergency. Facilities managers should look at the system as a whole component and not only as several separate pieces. Elements such as proper maintenance of fuel supplies, fresh air and exhaust air damper operation for the prime mover, synchronous gear for multiple generator sets, transfer switches, load shedding capabilities, distribution breakers and circuitry, battery backup emergency lighting, electrical riser diagrams, sequence of operation, emergency connection

#### ON OUR WEBSITE

A recent series of articles on *Health Facilities Management's* website focusing on climate change response and recovery as it pertains to extreme heat and cold, drought, hurricanes, wildfires and other climate-driven phenomena can be accessed at [hfmjournal.com/climate\\_change](https://hfmjournal.com/climate_change).

points for external load banks or temporary rentals and thermal imaging studies are just a few items in the overall emergency power system to consider as failure points.

**BAS and HVAC systems.** The building automation system (BAS) has the capability to do more than monitor and control

the HVAC equipment. An integrated BAS can give a facilities manager the ability to monitor and control an entire building remotely using a secure web portal.

One must remember that any BAS is a diagnostic tool, and user interface actions must be field verified for accuracy of action. As technology advances, so does the ability to integrate systems into a robust BAS.

Facilities managers must know their systems and the weak points in the chain of operation to mitigate an emergency.

HVAC functions are imperative to the operation of the physical environment, from specially pressurized rooms to patient comfort. When the HVAC system fails, the domino effect of clinical support fails. Pharmacy, radiology, surgical services, the sterile processing department and critical patient environments also fail. What is the redundancy and reliance of such systems?

The BAS and mechanical equipment work as a system to maintain the physical environment for patient care.

**Other systems.** Lighting systems are becoming more complicated than a simple switch to turn lights on and off. Is there a process to override the system in the event of a system failure? Improper lighting, or lack of lighting, can affect the moods of visitors, staff and patients, and can lead to errors and accidents.

The pneumatic tube system is a vital piece of building infrastructure supporting multiple departments with goods and products. A large campus might have miles of pneumatic tube, user stations and transfer stations all controlled by a central server. What implications are there if a patient laboratory sample gets lost or damaged in the tube system and a repeat sample must be obtained?

Other items to consider are supply chain issues related to obtaining goods and services needed to support the facility in an adverse weather event.

#### Frequent and widespread

Adverse weather events are becoming more frequent and widespread. Adverse weather-related events that might have existed in the past may no longer be the norm for the future.

The extreme cold temperatures experienced in Texas during February 2021 are a good example of how impactful this can be, bringing widespread impacts to large areas and many communities when temperatures are reached that facilities are not typically designed for nor equipped to address.

Regardless of the normal type of weather an area experiences, it is important to consider varying weather extremes in organizational EOPs. **HFM**



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The nursing homes chapter in the 2022 Residential *Guidelines* features clarified resident room sizes and clearances. This room has a cabinet at the entry to store occupant medications that support decentralized medicine delivery and windows that are oversized to maximize natural light and views of nature.

# FGI's *Guidelines* balance risk and cost

An overview of the 2022 edition while anticipating the 2026 cycle

BY JOHN L. WILLIAMS

One of the most surprising regulatory conversations I had in the past two years began with a question about droplet versus aerosol precautions and how they relate to the ventilation that should be required to mitigate COVID-19 transmission. I expect these kinds of questions from designers and engineers. I don't expect them from my retired aunt, an English teacher who has always viewed my interest in health care design regulation as a curious personality defect.

Conversations like this made the 2022 revision cycle for the Facility Guidelines Institute's (FGI's) *Guidelines for Design and Construction* documents unlike any seen before. It is common for Health

Guidelines Revision Committee (HGRC) members to hear debate about hand sanitization and what design is appropriate to isolate airborne infectious agents. Only after the onset of the COVID-19 pandemic have these topics become part of dinner table conversation.

This national public focus (and often controversy) over methods for containing infection underscores the important preparatory work the HGRC engages in every cycle. Every four years, a group of experts is convened to update the most recent edition of the *Guidelines*. This group — the HGRC — asks the simple question: What is a reasonable level of building safety? The HGRC frames that question not only in terms of what's

NORTH RIDGE AT ELISEO BY SHOESMITH COX; PHOTO BY BENJAMIN BENSCHNEIDER

reasonable for routine events but also for extraordinary ones.

## Expectations for 2022

The answers inform the newest edition of the FGI *Guidelines* documents, which are used by most states and federal agencies, in sum or in part, as regulatory minimums. They are also the de facto planning and design standards for the health and residential community.

To set expectations about what is in the 2022 documents, perhaps it's best to start with a topic that has not seen major changes. Considering the COVID-19 pandemic era into which the 2022 edition was born, it may be a surprise that there are no sweeping changes adding airborne infection isolation capacity or similar COVID-19-related mitigations. There are a couple of reasons for this.

First, the pandemic occurred at the midpoint of the revision cycle, past the point where new ideas could be considered, except to correct an error or clarify a significant issue. Second, the HGRC does its best to consider changes to minimum standards from a broad perspective and, while there are times when it is appropriate to respond quickly and purposefully, discretion is needed when making significant decisions that will affect health and residential care facilities for years to come.

Typically, during the process of revising the most recent edition of the *Guidelines*, the approach of the HGRC tends to revolve around conversations on two main topics:

- New ideas and data about relevant changes in how care is provided and in design and construction industry practices.
- The inexorable push and pull of what must be done versus what is recommended or best practice.

To the first point, the 2022 HGRC advanced several ideas it believes will aid in the design of facilities and the provision of care.

As health care organizations continue to adapt to new expectations and growing needs around behavioral health, the HGRC considered many approaches to solving physical environment problems. It tested some of those new ideas and created more options to aid in this



The 2022 *Guidelines for Design and Construction of Hospitals* includes requirements when a burn trauma ICU is provided. Because burn patients are highly susceptible to infection, patient rooms in this unit must be designed as protective environments.

response. Sometimes too many options can be overwhelming, but — given the broad spectrum of inventive responses based on unique operational plans — the HGRC believes the menu of space options provided in the 2022 *Guidelines* for addressing behavioral and mental health care needs will help care organizations and design teams determine how best to move a project forward. *Guidelines* users should expect to see options for behavioral health crisis units, emergency department rooms designed specifically for behavioral and mental

health care, and spaces to accommodate intensive outpatient/partial hospitalization programs.

Similarly, the HGRC acknowledged the need to add guidance for several specific services that may be relatively uncommon for a typical hospital and therefore have not previously had a dedicated section in the *Guidelines*.

These additions are based on well-tested designs or new approaches to old problems that have been employed enough to enter mainstream use. For example, the *Hospital Guidelines* now has sections on specialty hospital units such as hospice and burn care, and the *Outpatient* document describes how to create dual-entry

exam rooms to support improved patient throughput.

After several years' work, the HGRC created standards for patient care stations for treating low-acuity patients in the emergency department. The requirements for resident rooms in the *Residential Guidelines* and the requirements for dialysis facilities in all three books were updated to align with federal requirements for participation in the Medicare program. While many of the concepts covered by these requirements could be accomplished before, their inclusion in the *Guidelines* makes it easier to receive approval from authorities having jurisdiction (AHJs).

To the second point, the HGRC also tested the boundary of "should" versus "shall" language. This is a perennial tug-of-war between minimum standards and best practices. FGI has long held the position that standards should be based on risk. Many *Guidelines* requirements (e.g., write a functional program and create an infection control risk assessment) are opportunities for care organizations, designers and AHJs to probe the specific risks for a facility and apply the *Guidelines* in a way that best mitigates those risks.

Expect to see more flexibility in the 2022 *Guidelines* requirements based on a clearer understanding of risk, clarity that influences documentation and conversations with AHJs. In several cases, the

### ABOUT THIS ARTICLE

This article is published by *Health Facilities Management* ([HFMagazine.com](http://HFMagazine.com)) in collaboration with the Facility Guidelines Institute ([fgiguidelines.org](http://fgiguidelines.org)).



## E-commerce site and digital library created for the 2022 FGI Guidelines

The Facility Guidelines Institute's (FGI's) 2022 *Guidelines for Design and Construction* documents are available for purchase in paperback and digital formats at <https://shop.fgiguidelines.org>. The digital format features enhancements such as productivity tools that allow users to highlight important text; create notes on a specific section; bookmark pages; and review errata and formal interpretations, as well as application guidance, at the associated section of the *Guidelines*. The digital format is available as a single-user or multiple-user license and is renewable annually.

The new e-commerce website delivers pricing transparency and offers a user-friendly checkout, with options to create an invoice for a purchase order and (for nonprofit organizations) to select a tax-exempt option and upload tax-exempt documentation. These cart options speed up the ordering process for nonprofits and government organizations purchasing the *Guidelines* and reduce the operational burden on account administrators.

Organizations taking advantage of the multiple-user license may invite an unlimited number of users to join the licensed account and will only be charged for the number of individuals needing access to the *Guidelines* at the same time. Account administrators for multiple-user licenses also may designate access to users in any number of locations without incurring additional site-based fees.

The goal of FGI's new e-commerce site is to give users of the *Guidelines* convenient and cost-efficient access to the documents from one location. Digital and paperback versions of the 2018 and 2014 *Guidelines* can also be purchased directly from FGI's e-commerce site. For those needing access to older editions, the 2010 *Guidelines* and previous editions may be downloaded in PDF format at no cost from <https://fgiguidelines.org/guidelines/earlier-editions/>. ■

number of requirements or the size of a room has been adjusted. Most of these changes are reductions that result from learned experience and a careful review of existing requirements.

The 2022 revision cycle saw several changes that cede control back to health and residential care organizations and design teams to make good decisions for the projects they represent. However, along with this control comes risk. For example, a requirement for commissioning and training for special systems (e.g., elevator control, access control, special power control, etc.) was deleted. This could be seen as a good deal for hospitals with a very robust in-house commissioning program and clear contractual expectations for getting these systems up and running, training staff, and handing off operations and maintenance responsibilities for such systems.

From the perspective of these hospitals, their procedures cover — if not exceed — the requirements in the *Guidelines*. For organizations that do not have such a program, or perhaps that can barely muster the resources to keep up

with a big project, this change transfers risk back to the organization. The risk is that the design team or the facility staff will not be adept enough to ensure the systems function properly and staff won't know how to maintain them. It's a classic discussion about self-determination, where some facilities, staff and patients may benefit and others may not.

The HGRC ultimately did not settle a few important issues — primarily the proposal to include a chapter on extended stay centers in the 2022 *Outpatient Guidelines*. This facility type, often associated with an outpatient surgery facility, is intended for postoperative care for patients who cannot travel home the same day because of distance or who may need care for more than 24 hours post-procedure. Because the services provided in such a facility would be relatively limited (i.e., follow-up for simple ambulatory surgery procedures), the

HGRC anticipated a physical environment less restrictive than that of a hospital would be permitted.

However, concerns arose over the inclusion of an extended stay center as an outpatient facility, as the type of care provided would challenge some fundamental concepts of what separates inpatient services from outpatient services. That traditional line — 24 hours of continuous care for a specific patient in a specific place — has been carefully defined and articulated over the past few decades in the building and life safety codes, not to mention the licensing codes in many states. The heart of the concern is that defining an extended stay center as an outpatient facility would create conflict and confusion across requirements and cause significant challenges to enforcement. This concept is still an excellent idea and one the HGRC will pursue in the next cycle.

### Anticipating 2026

In addition to extended stay centers, the HGRC expects to pick up several other topics in the 2026 cycle. A primary focus will be considering the lessons the industry continues to learn from the COVID-19 pandemic and determining how to incorporate this knowledge into the *Guidelines*. There have been many calls to rethink the physical environment over the past two years, but the HGRC does not react to those voices without focused thought from a broad group of perspectives. FGI's Emergency Conditions Committee was formed to do just that, and their efforts resulted in a white paper and a series of recommended changes to the *Guidelines*. It's now the task of the HGRC to take those recommendations and vet them through the HGRC's rigorous process.

Another exciting effort will be to consider a new facility designation from the Centers for Medicare & Medicaid Services (CMS). In 2021, the Consolidated Appropriations Act created a new federal designation intended to allow certain hospitals to participate in a new reimbursement program for the "rural emergency hospital." The operational footprint of this facility type appears to be a little different than a traditional rural or critical access

RESOURCE

i The American Society for Health Care Engineering's Architecture for Health Showcase Digital Directory can be downloaded at [archshowcase.org](http://archshowcase.org).

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hospital. Effectively, it is an emergency room with the potential for some wrap-around services and perhaps the addition of a skilled nursing unit. The CMS rule-making process is already underway to launch the program by 2023. The HGRC will watch carefully as CMS further determines the functions permitted and their expectations for the provision of care in rural emergency hospitals. The 2026 cycle will be a good opportunity to consider standards for this new facility type and describe those fundamental requirements in the *Guidelines*.

Also, there is interest in considering development of survey standards for existing facilities. Like most building and construction codes, the *Guidelines* documents provide fundamental requirements for new construction and major renovation projects. However, the current edition of the *Guidelines* should not be applied retroactively to existing facilities unless the physical environment or the function of a space is changed. Here is the rub, though: Most AHJs and accrediting organizations perform annual surveys of existing facilities, and putting

an existing facility into the appropriate context may require access and understanding of many *Guidelines* editions. The interesting concept is to consider all the previous iterations and establish a “lowest common denominator” set of survey standards that could be used for existing facility surveys. This approach does not intend to encourage a new facility to go backward, such as surveying a one-year-old facility to standards from 1960. Rather, the goal is to create a good starting point for existing facility surveys.

The HGRC will also continue conversations it’s been having for years. Additional attention will be given to spaces for treatment of behavioral and mental health patients. The HGRC has new territory to chart in facility types that range from forensic to residential, and it will continue exploring extended stay centers.

Finally, the health care fields all bore witness as the pandemic evolved into a staffing crisis. Now the HGRC must consider how to design buildings that are more efficient for the staff. For the *Guidelines*, that translates to asking how the regulations assure safety while

accommodating efficiency. The pandemic has exacerbated chronic problems around transitioning patients out of the hospital into other institutions. Maybe the HGRC needs to create a new or redefine an existing hospital space to aid in those transitions? The HGRC doesn’t adequately describe the design of long-term acute care facilities, whether in the hospital or as a standalone facility. This is worthy of at least a new section, and perhaps a new chapter. All these ideas require a challenging, interrogating review that asks repeatedly: What is reasonable? What is a fundamental requirement, and what is a best practice? What is the substantiation to support the conclusion?

**Broader perspectives**

To my aunt’s question, I gave her the simple yet unsatisfying answer of an AHJ: it depends. Describing something that is measurable can be done in finite, albeit complex, ways. Sorting those measurements into categories helps make sense of complexity. What “should” be done versus what “shall” be done with those categories often depends on one’s interpretation and perspective. But don’t worry, with each revision cycle, the HGRC gathers – and acts on – better information.

The HGRC has broader perspectives around the table, which leads to richer discussions. It has a community of designers who are always asking “What’s next?” and “What’s better?” There is a country full of AHJs and facilities engineers whose goal is not mere compliance but enhanced protection and safety for both patients and staff. And there is a broad array of clinical personnel who keep the HGRC focused on how the physical environment can best support staff and improve patient outcomes.

Essentially, a whole team of health care design professionals is working on answering my aunt’s question. And it’s an exceptional team. **HFM**



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Revisions made to the outpatient dialysis facility requirements in the 2022 *Guidelines* provide improved sightline requirements, minimum clearances around chairs instead of clear floor areas and modifications for patients who require special precautions.

CHILDREN'S HEALTH, CHILDREN'S MEDICAL CENTER, DALLAS, NEPHROLOGY TOWER RENOVATION, BY HKS INC.; PHOTO BY HKS INC.



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Infrared thermography is a common method for nondestructive testing of electrical equipment.

# Predictive maintenance for hospital equipment

An important tool in a health care facility's RCM toolbox

BY DAVID STYMIEST, PE, CHFM, CHSP, FASHE

**P**redictive maintenance (PdM), also known as condition-based maintenance (CBM), can improve the reliability of health care infrastructure equipment and systems, while also reducing maintenance costs.

In fact, PdM or CBM can help health facilities professionals solve problems they may not even know exist.

Although PdM is only one element of an overall reliability-centered maintenance (RCM) program, it is a very important tool in the RCM toolbox and a very useful supporter of RCM decisions.

## PdM and RCM

When discussing PdM, one first needs to consider its place within an overall

RCM program. RCM was discussed in an article by Rick Joslin on *Health Facilities Management's* website entitled "A journey toward reliability-centered maintenance," which was one of a series of reliability asset management articles (see the resource box on page 40 for more).

In the article, Joslin describes RCM as a strategy that "requires the organization to think through all aspects of an asset's existence — from what it is supposed to do, to how it is supposed to do it, how it can fail (including hidden ways), what is affected by a failure and what could be done to prevent failures."

As just one element within an overall RCM program, PdM can be a very useful process to assist health care facilities in identifying potential future failures in

time to avoid the consequences of those failures, and thus preserve the functions of the assets as well as the systems those assets serve.

Many health care facilities currently have ongoing preventive maintenance (PM) programs that consist of lists of activities (often called PMs) to be performed at calendar-based intervals. Sometimes those PMs are based upon past practices, and sometimes they are based upon the original equipment manufacturer (OEM) recommendations.

CMS Tag A-0724 – “Facilities, supplies, and equipment must be maintained to ensure an acceptable level of safety and quality,” requires facilities to inspect, test and maintain all equipment to ensure they are safe, available and reliable. This requires that the organizations subject to Medicare and Medicaid requirements be able to prove compliance with the following hierarchy of inspection, testing and maintenance requirements, including:

- Law and regulation.
- OEM recommendations for both activities and related frequencies – if the organization does not have a Centers for Medicare & Medicaid Services (CMS)-compliant alternative equipment maintenance (AEM) program in effect.

Requirements of a Tag A-0724-compliant AEM program.

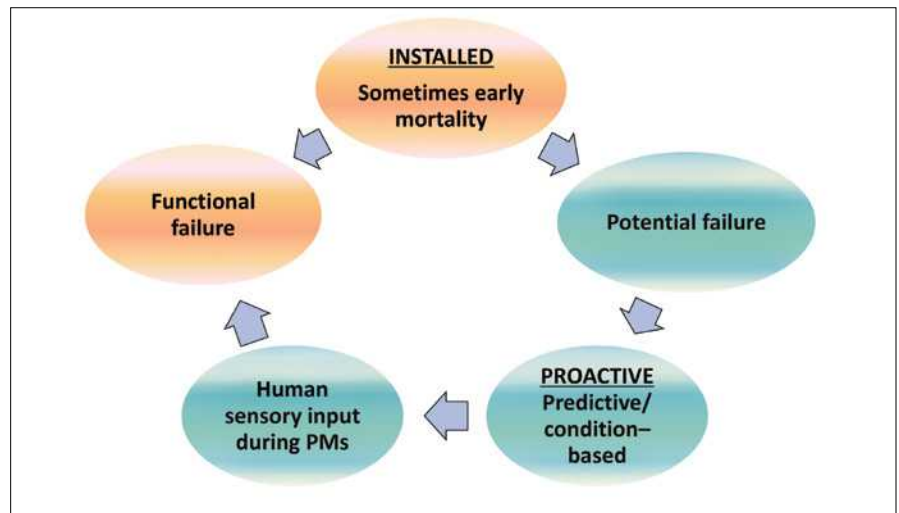
While many health care organizations believe their existing historical PM processes to be compliant with OEM recommendations, some may not be able to prove their compliance during accreditation surveys. This is because the processes (activities and related frequencies) and written PMs in many cases were established long before CMS updated Tag A-0724 on Dec. 20, 2013, or even its Dec. 2, 2011, predecessor Survey and Certification letter 12-07-Hospital – Clarification of Hospital Equipment Maintenance Requirements.

The 2014 American Society for Health Care Engineering (ASHE) book entitled *Maintenance Management for Health Care Facilities* is referenced by CMS Tag A-0724 as an acceptable source of guidance for AEM Program decisions. The ASHE book preface states, “Besides preventive maintenance there are alternative approaches such as reliability-centered maintenance, predictive maintenance and conditional maintenance.” Appendix D, entitled “Conditioned monitoring/predictive maintenance,” includes

discussions of techniques such as infrared thermography, ultrasound testing, vibration analysis and oil analysis.

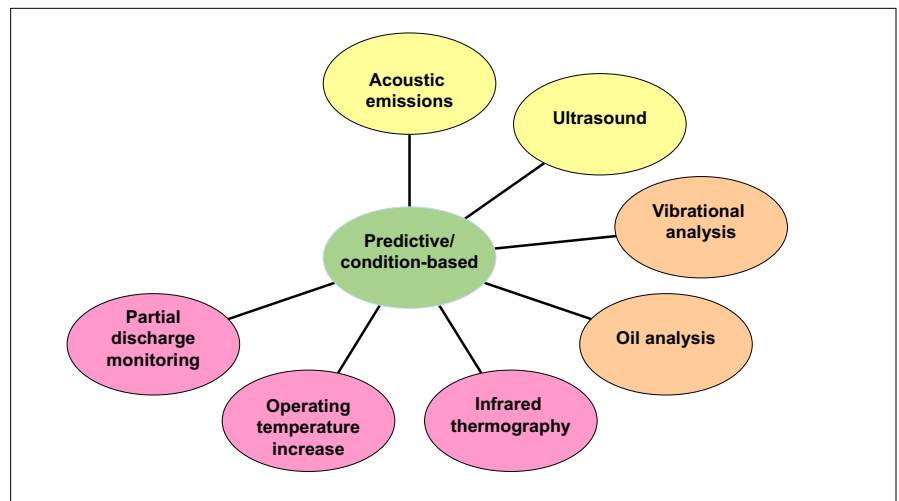
**In-person options**  
Many health care organizations have for years authorized regular in-person inspections using non-destructive testing (NDT) of physical environment equipment. Two simple examples are generator fuel oil testing and medium-voltage transformer oil testing.

## Potential equipment failure process



Predictive maintenance is viable between the initiating “potential failure” condition and “functional failure.”

## Predictive/condition-based maintenance options



The seven most common predictive maintenance technologies.

The annual generator fuel-oil test is code-mandated, and the transformer oil

### In-person options

test is generally governed by OEM recommendations; the National Fire Protection Association’s NFPA 70B, Recommended Practice for Electrical Equipment Maintenance; or the American National Standards Institute/InterNational Electrical Testing Association’s Maintenance Testing Specifications for Electrical Power Equipment & Systems.

The in-person PdM inspection and testing approach has historically relied upon scheduled PdM inspection and testing activities by personnel, depending upon the time frame, which are intended

The in-person PdM inspection and testing approach has historically relied upon scheduled PdM inspection and testing activities by personnel, depending upon the time frame, which are intended

test is generally governed by OEM recommendations; the National Fire Protection Association’s NFPA 70B, Recommended Practice for Electrical Equipment Maintenance; or the American National Standards Institute/InterNational Electrical Testing Association’s Maintenance Testing Specifications for Electrical Power Equipment & Systems.

## Additional maintenance issues that can benefit from PdM

**B**eyond the examples discussed in the main article are many other unexpected health care facilities maintenance issues that can be remedied by using predictive maintenance (PdM) techniques. They include the following:

- **Electrical signature analysis (ESA) for motors.** ESA uses both historical and newly considered inputs. These inputs include machinery (vibration) analysis, spectrum analysis of the frequency content of a time domain signal, and frequency analysis of time waveforms. ESA uses a motor's supply voltage and operating current to identify existing and developing faults in the entire motor system. These measurements act as transducers and any disruptions in the motor system cause the motor supply current to vary (or modulate).

- **In-person PdM inspection and testing of variable frequency drive (VFD) bus capacitors.** VFD bus capacitors have a limited life span. They can and sometimes do fail within the expected service life rating. The expected service life rating only can be used as a general guideline because of conditions that can reduce the capacitors' actual life span below the service life rating. Overtemperature, overvoltage, overcurrent, improper mounting or clamping, terminal connections, electromechanical wear and shelf life all are conditions that can reduce the limited life span of VFD bus capacitors that age faster than dry components. Overtemperature alone dramatically decreases the life span of the bus capacitors.

- **In-person PdM inspection and testing of uninterruptible power supply (UPS) capacitors.** Capacitors and batteries are the UPS components considered most prone to failure. Capacitors age over time, thus reducing performance. Excessive heat or current can speed up deterioration. Some capacitors are rated to deliver up to 10 years of service life with favorable operating conditions. Apparently, it is not uncommon to replace capacitors between four and eight years to reduce failure risk.

Common capacitor failure modes are reported to be excessive current, overuse (also called overwork) and/or excessive heat. Recommended routine in-person PdM inspection and testing includes inspections for oil leakage, deformation, scorched wires connected to the capacitor, burnt valve cap protrusion, small (or greater) increase in capacitor temperature and capacitance. The PdM activities include visual inspection, thermal imaging and use of a capacitance meter. ■

to provide sufficient time for planning an outage and performing maintenance activities to prevent the future failure before that failure occurs. The key is that the scheduled inspection and testing activities must occur sufficiently in advance of any potential failure to allow the corrective action time necessary to avoid that future failure.

Another simple example of an in-person process versus a permanently installed process is the code-based requirement regarding testing of line isolation monitors (LIMs), which are used in isolation power systems that serve operating rooms.

These devices are required by code to be tested at least monthly by actuating the LIM test switch in accordance with NFPA 99-2012, section 6.3.2.6.3.6. However, for LIM circuits with automated self-testing, a manual test is only

required annually. A monthly manual in-person requirement becomes an automated process, plus an annual in-person requirement with presumably no adverse impact on equipment performance or patient safety.

- **Infrared thermography (sometimes called "infrared scanning").**

Some common historical uses of such NDT in health care organizations have been infrared thermography testing of electrical equipment (such as transformers, switchgear, switchboards, panelboards, transfer switches, generators, cables and wiring connections); mechanical equipment (such as rotating equipment, bearings, steam traps, ducts and piping); and outer

surfaces of buildings, commonly known as building envelopes.

The results of those scheduled infrared thermography inspections may identify indicators of potential future equipment failures. These indicators, when acted upon in a timely manner, can provide opportunities to avoid potential failures before any related damage or other adverse consequence occurs.

- **Ultrasonic condition monitoring.**

Another example of NDT is ultrasonic condition monitoring, which is not a new technology. Ultrasonic sounds are usually received through the air and through solid surfaces. Pressurized system leaks can be detected with an ultrasonic acoustic scanning device. Ultrasound technology is also used to detect structure-borne situations, such as those generated by bearings or by leaky valves.

Mechanical defects in rotating machinery, including out-of-balance conditions, a bearing about to seize, or other types of vibration or misalignment may be detected with ultrasonic acoustic monitoring or other types of vibration analyzers. The collection and analysis of vibration data associated with rotating machinery is also used to detect component defects and allow mitigation of pending rotating machinery failure for generators, motors, fans, air-handling units and other equipment.

Additionally, gas and liquid leakage can produce a broad range of sounds that can be picked up by ultrasonic monitoring. As subtle changes begin to occur in mechanical equipment, the directional nature of ultrasound allows these potential warning signals to be detected early before an actual failure.

However, mechanical equipment is not the only equipment that can benefit from ultrasonic monitoring. As an example,

hand-carried ultrasound monitoring equipment has been used for several decades as a process to detect potential failures in medium-voltage electrical equipment. Electrical emissions such as arcing, tracking or corona also produce a broad range of sounds.

With effective monitoring equipment, the ultrasonic components of these sounds are usually directional and localized, making it easy to isolate these signals and detect their sources.

RESOURCE

i To learn more about reliability-centered maintenance, access the "Reliability Asset Management" series of articles at [HFMMagazine.com/RAM\\_series](http://HFMMagazine.com/RAM_series).

• **Partial discharge (PD) monitoring.**

PD monitoring, also sometimes called “electrical discharge testing” or “corona testing,” is another very useful process for assessing the condition of electrical systems, and even electrical motors. The PD, acting as a small spark inside or on the surface of electrical insulation, is a leading indicator of a potential insulation problem. PD activity that accelerates quickly can result in complete insulation failure. PD can happen in air gaps, voids, cavities, spacers, supports, gaps inside conductor insulation and other locations.

Most PD monitoring in health care facilities is presently used during scheduled inspection and testing activities. Although periodic in-person inspection and testing PD surveys can provide important results, the benefits of installed PD monitoring systems can provide more effective results.

Installed PD monitoring equipment is often more sensitive than portable PD equipment, and it also checks and reports the health of the monitored equipment. Because PD measurements are based on both power system operating conditions and related equipment environment, an online system is likely to provide more reliable results than an offline system.

PD analyses can detect many pending issues within electrical switchgear, including discharges in air gaps, surface tracking, sparks within insulation voids, insulation problems in cable terminations, insulation problems in connected equipment, poor electrical connections, defects in potential transformers or current transformers, and problems with incoming bus ducts (busway sections).

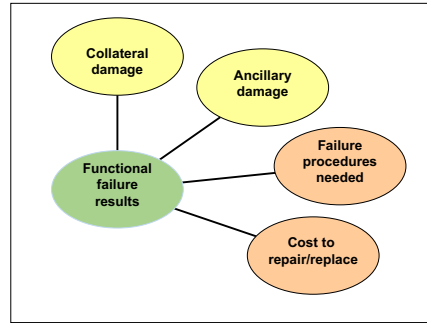
**Equipment failure**

The simplest visual approach is often known as the P-F curve, where P represents a point where “potential failure” can occur (meaning that the failure process may commence anytime but has not concluded), and F represents the point where the equipment in question has “functionally failed” (meaning it’s too late).

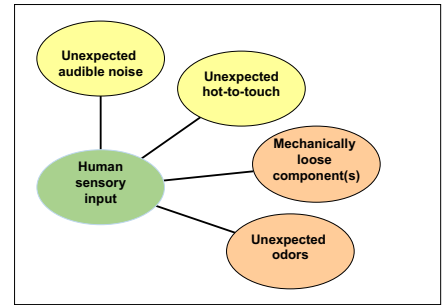
There have been numerous studies, publications and graphics of equipment failure patterns and the related individual versions of P-F curves. An internet search can provide easy access to those sources.

Most P-F curves differ from each other. However, there tends to be some degree of similarities among many of the variations. For example, the equipment condition

**Functional failure results**



**Human/sensory input during PMs**



**LEFT:** Typical outcomes of a functional failure. **RIGHT:** Although not predictive maintenance, these four possibilities during scheduled preventive maintenance may help avoid a full functional failure event.

is usually at its highest at the start of the curve and equipment condition is as high as it is likely to be. (Sometimes issues arise right after installation or right after repairs, and sometimes they do not.)

Then, after some period, the potential failure may occur. This means that the failure process may be initiated before long. Some things are just unpredictable, and that is why facilities professionals measure and probe with the technical resources of the PdM devices.

Next is what some might call a predictive portion of the P-F curve. The potential failure may have occurred, but it may not be known yet, unless the facilities professional has been probing effectively. One or more of the following tools may catch it, depending upon the technology being used and the choices in applying options such as acoustic emissions and ultrasound (previously discussed), vibration analysis (changes in vibration), oil analysis (wear debris in oil), infrared thermography, operating temperature increase and partial discharge monitoring.

After that, in the absence of PdM equipment and processes (either manually operated or permanently mounted and functioning), facilities professionals may have scheduled some PM in a timely manner and are able to determine the following through human sensory input, even though the equipment still appears to be functioning to some degree: (1) there is audible noise coming from the equipment that should not be there; (2) the equipment is hot to the touch and hotter than previously experienced; (3) some portion of the equipment is mechanically loose; (4) something smells wrong in the equipment space; and (5) anything else that doesn’t seem right.

And, finally, there is the equipment functional failure zone. There may also be collateral damage and/or ancillary damage. Facilities professionals should make sure their mandatory equipment failure procedure is effective, applies to the failed component(s) and is accurate and up to date because it is then too late to create one. The repair and replacement cost is probably also at its peak, with no time to negotiate costs or schedules.

**Consider the options**

Facilities professionals must consider their available PdM options and assign the options (either in-person applications or permanently installed applications) that best support their RCM decisions for each asset to which they plan to assign PdM.

Understanding the most likely failure modes for the equipment under consideration for PdM should be an important factor in PdM choices. If facilities professionals want to start with their utility equipment inventory, they should make sure it is up to date and accurate first.

Additionally, they should consider carefully what technologies they will use and where. Different systems and equipment may have very different failure modes, and technology choices could be quite important.

Finally, facilities professionals should take advantage of the options already in place – they may already have a portion of a robust in-person PdM process for some important equipment or systems. **HFM**



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GRAPHICS BY THE AUTHOR



# Lighting manufacturers address hospital needs

Top concerns include efficiency, controllability, infection prevention and more

**A**dvances in lighting fixtures and controls cover many areas that can benefit hospitals and other health care facilities.

For example, manufacturers see a growing trend toward sealed and cleanable fixtures as well as reduced dependence on wall-mounted fixtures in patient care areas.

There also is a lot of interest in light-based, continuous disinfection technology as well as touchless controls. Another major design trend is toward architectural aesthetics: lighting fixtures with clean lines that are less bulky and can almost disappear into a space.

Internet of Things (IoT) controllability, which can add wireless and touchless

control to virtually any dimming fixture or on/off device, represents another trend. It allows hospital staff to control lights locally with an app or a computer dashboard from a central location.

Another trend is toward smaller lighting form factors being used in hospitals, according to Lou Calvo, regional sales manager at Kenall Manufacturing, Kenosha, Wis. "Additionally, the use of lighting controls is a must. They give patients and staff the opportunity to adjust lighting as needed. With LED now considered the standard, energy efficiency has become the expected norm."

## Energy and more

In fact, energy efficiency has been and will remain a driving factor for lighting fixtures and controls in health care spaces. "Energy efficiency is important throughout hospitals," says Christian Groom, senior product marketing manager at Legrand, Carlsbad, Calif. "This includes scheduling (after-hours settings),



## PLEASANT SURROUNDINGS //

Ledalite NatureConnect Natural lighting system creates a pleasant environment for patients and health care workers. **Signify**

occupancy or vacancy sensing, and automated shading systems to maximize ambient lighting usage."

Many hospitals are adding occupancy sensors that dim light levels to save energy when areas are unoccupied. Also, there has been a lot of interest in occupancy controls for outdoor lighting and parking garages. "Some of the campuses we work with are large," says Deepak Kumar Gedela, lighting controls specialist at Ledvance, Wilmington, Mass. "In addition to the energy savings, security patrols appreciate the security alerts that motion sensors provide."

New LED luminaires are more energy-efficient than their predecessors due to high-efficacy LED light sources, combined with optical and electronic component efficiency. "They offer longer life for easier maintenance cycles and are intuitively designed to interface with various control platforms," says Patricia Rizzo, health care and wellness programs manager at LaSalle, Quebec-based BalancedCare by



**CLEAN OPERATOR** // The MSUi-DFX is a recessed surgical luminaire with UVA disinfection technology that continuously reduces bacteria within the operating room. **Viscor, a Leviton Company**



**MULTIFUNCTIONAL** // The HPL Series offers exam, ambient, reading or night light functions within the same luminaire. **Acuity Brands**



**LOST AND FOUND** // Trellix locate software application is a real-time location system that allows facilities managers to manage and locate their assets within the facility by leveraging their WaveLinX Pro-enabled lighting system. **Cooper Lighting Solutions**

Axis Lighting. “Even spectrally tunable systems, when programmed to maximize circadian effect at specific times of day, can save energy over traditional systems.”

Luminaire-level lighting controls (LLCs) are the fastest-growing control option in indoor lighting and are now gaining momentum in health care, especially for small- to mid-size buildings such as outpatient clinics, according to Martin Mercier, strategic marketing manager for IoT and connected systems at Cooper Lighting Solutions, Peachtree City, Ga. “While health care facilities, especially large hospitals, have not widely adopted wireless lighting control, LLC benefits are getting more attention.” LLC luminaires are independent from other luminaires. They can be controlled individually or programmed as a group.

More hospitals are integrating lighting controls with information technology (IT) systems that allow smart luminaires to share information via the internet. IoT links the lighting to other systems, such as hospital security cameras, elevators and ID badges. “These smart luminaires share information on their operational status, efficiencies and LED energy use, and notify facilities managers about end

of life — for example, when it’s time to change out components,” Rizzo says.

New research suggests that light exposure can offer major health benefits. This includes both visible and non-visible light frequencies. “Our ability to manipulate light frequencies and intensity across the entire spectrum through LED chip design and targeted control technologies allows us to design products in concert with the research and quickly bring new solutions to the market,” says Greg Galluccio, senior vice president of product management and engineering at Energy Focus Inc., Solon, Ohio.

Smaller, off-campus health care facilities tend to have limited budgets when it comes to lighting renovations and updates. Therefore, the default strategy is to opt for standalone controls, which are more functional. However, this limits the ability of the central office to remotely monitor and manage lighting assets.

“This forces satellite facilities to invest in local electricians and maintenance staff and opt for a siloed approach, which can result in a mix of control platforms that can become outdated,” says Rahul Shira, senior product marketing manager at Signify, Bridgewater, N.J.

“Newer technologies, such as the Interact Pro scalable system, make it possible to set up lighting controls in a standalone mode, so they don’t cause too much disruption for smaller facilities; yet they can tap into the benefits of connected systems,” Shira explains. “For example, they can interface with the central office to allow for remote monitoring and maintenance.”

When it comes to specifying and installing lighting fixtures and controls, hospitals pose some challenges to manufacturers. “Many applications require technical expertise to determine the appropriate luminaires and controls because of the critical nature of the work being done in hospitals,” Calvo says. “One example is surgical suites, which require high illumination levels and sophisticated controls. It’s also important that all components work cohesively.”

Regarding IoT, the health care sector has its challenges and opportunities, according to Gedela. “Rolling out a new building management system or networked lighting controls can be a tough sell due to the high level of collaboration that is required between facilities managers, IT and hospital administration.



◀ **STEP LIGHTLY** // The Sylvania UltraLED ultrasonic stairwell fixture features color-changing technology and lumen selectability. **Ledvance**



▲ **COOL SHADES** // DLM shading systems feature automated/motorized shades that seamlessly integrate with lighting fixtures and controls. **Legrand**



◀ **RELAXING RHYTHMS** // The EnFocus control delivers healthy circadian lighting functionality over existing wire lines for simple, secure, healthy light. **Energy Focus Inc.**

Automation and lighting controls also must work in harmony with backup power sources when line voltage drops out."

**Something new**

New lighting fixtures and controls offer many of the aforementioned benefits to health care facilities. Viscor, a Leviton lighting brand based in Toronto has introduced the Certolux MSUi-DFX luminaire featuring 365DisInFx UVA technology, which is designed to promote cleaner surgical suites. "This surgical lighting fixture with continuous UVA disinfection technology reduces surface bacteria in occupied operating rooms and is suitable for 24-hour human exposure," says Tim Stevens, director of product management at Certolux.

As a step away from traditional bulky troffers, Healthcare Lighting, a part of Acuity Brands, Atlanta, has introduced the HPL series, a recessed linear lighting solution that delivers single- and multi-modal functionality for patient rooms, hallways, common areas, and exam or procedure rooms. The multiple modes of lighting allow users to easily switch between exam, ambient and reading modes. "Asymmetric distribution is

available for offset mounting in hallways to reduce direct lighting into patients' eyes," says Cleveland Blankenship, business unit leader. The HPL series has IP64 and NSF2 ratings as well as secondary color options for other specialty application areas.

Expanding on its Balanced Care line of luminaires, Axis Lighting recently launched the Tranquility series, a line of graphic image luminaires that address the biophilic element to provide a sense of calm by bringing the outdoors inside. Photography and custom-textured pat-

terns integrate into ceiling mounts and sconces for use throughout hospitals — from waiting areas to nurse stations, from conference rooms to dental exam rooms. "We've also added a series dedicated to pediatric environments, which includes waiting rooms, newborn intensive care units, daycare centers and classrooms," Rizzo says.

David Buerer, director of product management at Leviton, Melville, N.Y., says his company has made advances in color tuning. "One recent solution we deployed involves color tuning to support improved surgical recovery. It is based on

research that says patients recover more quickly from surgery when they come out of a sedated state in the morning. Our controls system, in concert with color tuning light fixtures, allows the nurse to start the day cycle as the patient is waking up and maintain it throughout the patient's stay."

Signify recently introduced the Ledalite NatureConnect natural lighting system, which is designed to reconnect patients to the outside world — specifically, the constant cycles and variations of nature — creating a comfortable, engaging indoor environment. The system combines various LED luminaires with intuitive lighting controls for a fully immersive, natural experience, according to Shira.

"The NatureConnect system can be used to improve patient and staff well-being with its natural 'day rhythm' functionality," Shira says. "It automatically provides the right light according to the time of the day, following the pattern of the sun." An intuitive user interface makes it easy for patients and staff to control the lighting; users can switch between the automatic day rhythm or choose one of three natural light scenes that may be better suited to the user's activity or need.

▶ **MORE ONLINE**

Learn more about these products at [www.HFMmagazine.com/marketplace](http://www.HFMmagazine.com/marketplace)

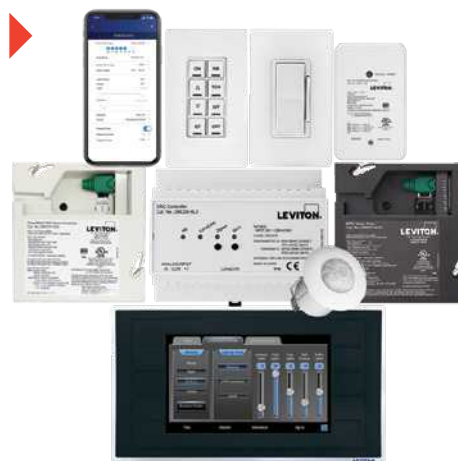




◀ **SAFETY FIRST** // The MedMaster MRIGT series is constructed with non-ferrous materials and remote power supplies to prevent interference with magnetic resonance imaging equipment. **Kenall Manufacturing**



▶ **COMPLETE CONTROL** // GreenMAX DRC wired and wireless solutions help promote well-being in health care environments. **Leviton**



▲ **NATURAL BEAUTY** // Sunflowers are featured in this regressed lens 2x4 configuration. **Axis Lighting**

## Scalable systems

Cooper Lighting Solutions recently introduced lighting control options for its WaveLinX wireless system, WaveLinX Lite, and a new app for its Trellix platform, Trellix Insights. “The WaveLinX scalable system can be upgraded from Lite to Pro, making it suitable for everything from a single floor to an entire campus,” Mercier says. “It can be connected to Cooper Lighting Solutions’ IoT platform, Trellix, which provides further building insights and remote management.”

Trellix Insights is an intuitive, web-based tool that leverages data collected by the lighting system, which provides instant visibility and reports for space optimization. By gathering space information, Trellix Insights helps facilities managers make accurate forecasts and avoid unnecessary expansion or reduction. Also, under its Fail-Safe brand, Cooper Lighting Solutions recently improved its tunable white light offering and added UVC-related products.

Energy Focus offers the EnFocus lighting control system, which can manipulate the light spectra within a wide range of areas in health care facilities. Unlike wireless control systems that incorporate transmitters and receivers in controls and light

sources, the EnFocus system uses power line control technology to send control signals across existing supply wires, which reduces cost and improves reliability and security, according to Galluccio.

Inspired by its MedMaster MPH patient room headwall luminaire series, Kenall Manufacturing has introduced the MedMaster BHH headwall, which is designed to meet the unique demands of behavioral and mental health environments. “The BHH offers a sleek style, multiple functions and the safety features paramount to patient care, including ligature-resistant design, tamper-resistant hardware and polycarbonate lenses,” says Lynn Walldorf, product marketing manager. Options include a built-in 2,700 Kelvin (K) or amber nightlight, battery backup and a low-voltage controller.

Efficient lighting in hospital stairwells also is important. To that end, Sylvania UltraLED Ultrasonic Stairwell Fixtures from Ledvance employ an ultrasonic sensor to detect motion where line of sight is not feasible. Featuring both color changing technology (CCT) and lumen selectivity, the fixtures are available in 2-foot and 4-foot lengths with 3,500 K, 4,000 K or 5,000 K CCT output. They can

be surface-mounted and are available with optional battery backup units.

Legrand recently introduced DLM shading systems, which feature automated and motorized shades that seamlessly integrate with lighting fixtures and controls. “They offer an experience that many designers and architects are looking for today while providing premium occupant comfort and experience,” Groom says. Wiring is simple, he adds, with preconfigured CAT 5 for connecting shade controllers and switches, and preconfigured four-wire connections for each shade and shade bus.

## Looking ahead

In the near future, LED technology will continue to improve efficiency, manufacturers agree, and more lighting products will incorporate UVC disinfection features. Another prediction is increased adoption of IoT-related solutions such as asset tracking, location-based services and energy optimization through data analytics tailored to the facilities manager. **HFM**



**Neal Lorenzi** is a Mundelein, Ill.-based contributor to *Health Facilities Management*.

# Hospital confined space programs

## Identifying facility vulnerabilities and improving compliance

**H**ealth care facilities management professionals are primarily concerned with meeting the vast requirements of The Joint Commission, DNV, Healthcare Facilities Accreditation Program, Centers for Medicare & Medicaid Services, and state and local authorities having jurisdiction, yet they may often miss the fundamentals of a great safety program, which all of these agencies require.

One of these fundamentals is a confined space program as required by the Occupational Safety and Health Administration (OSHA). There are two related but different standards regulating confined spaces for routine work atmospheres (OSHA General Industry Standard 1910.146, Permit-required confined spaces) and construction sites (OSHA Construction Industry Standard 1926.21(b) (6)), also addressed in the 2016 edition of the National Fire Protection Association's NFPA 350, Guide for Safe Confined Space Entry and Work.

OSHA defines a confined space as one that is large enough for an employee to enter and perform assigned work; and has limited means of entry or exit (e.g., tanks, vessels, storage bins, hoppers, vaults and pits); and is not designed for continuous employee occupancy.

A permit must be built into the confined space policy, and there are many versions of a permit-required confined space (PRCS) permit on the internet. OSHA provides resources on developing a program, or a health care facilities manager can reach out to someone qualified within their organization or to a third-party safety company certified in confined space program development. A copy of a confined space permit downloaded from OSHA's website is shown on page 47 of this article.



There are many overlooked spaces both inside and outside of health care facilities that can be classified as confined spaces.

### A big deal

Some health care facilities professionals may think "health care facilities do not have confined spaces" or "it isn't a big deal." Yet, according to data by the Bureau of Labor Statistics, 1,030 workers died from occupational injuries involving a confined space from 2011 to 2018.

According to the Centers for Disease Control and Prevention, 80% of fatalities happened in locations that previously had been entered by the same person who later died. Only 7% of locations had warning signs indicating they were confined spaces and 65% of confined space fatalities were due to atmospheric hazards. However, confined space fatalities can be avoided through a comprehensive confined space program that includes routine training and a systematic approach to confined space entry.

There are many overlooked spaces both inside and outside health care facilities that meet the criteria to be classified as a confined space as well as a PRCS. To determine this, health facilities professionals must first understand what

a confined space is and then perform a survey. Should the results of the survey reveal confined spaces, facilities professionals then must determine whether any of the confined spaces also are PRCSs. Then, they must develop a confined space program.

The program must include a policy; an inventory; and a pre-entry, entry and post-entry plan. It also must include a training and competency program that involves training a confined space rescue team. In fact, more than 60% of confined space fatalities occur among would-be rescuers. Therefore, a well-designed and properly executed rescue plan is a must.

Confined spaces that health facilities professionals may encounter throughout a facility might be in the form of an air handler, a crawl space, a pit or a tunnel that cannot be exited without using stairs or a ladder. Other examples include openings as small as 18 inches in diameter, a place difficult to enter with a self-contained breathing apparatus (SCBA) or other life-saving equipment, an area where the opening makes it difficult to remove

IMAGE BY GETTY IMAGES

a downed worker in a folded-up or bent-over position, and even openings that are larger than 18 inches but have cluttered exit paths due to the presence of ladders, hoists and other equipment.

Another defining characteristic of a confined space is one where there is a lack of air movement in and out, which can create an internal atmosphere different than the surrounding atmosphere. In such a situation, deadly gases could be trapped inside, and organic materials could decompose, causing a lack of oxygen due to the presence of other gases or chemical reactions.

A confined space is not designed for continuous worker occupancy nor to be entered and worked in on a regular basis. It may be designed solely to store a product, enclose materials or processes such as a pipe chase or utility tunnel, or transport products or substances. It may be designed for occasional worker entry for inspection, repair, cleanup and maintenance. Communication may be difficult to maintain as individuals on the outside may not be able to see or hear the people inside.

A PRCs is a space that contains or has a potential to contain a hazardous atmosphere, has the potential risk of engulfment by material or an internal configuration (walls that converge inward or floors that slope downward and taper into a smaller area) that could trap or asphyxiate a worker, or has the risk of other physical hazards (such as machinery with moving parts or the potential for shock, burns, explosion, drowning or heat stress).

A PRCs meets all the definitions of a confined space but, because of additional hazards that cannot be eliminated, a permit is needed, as is training for staff to safely work in the space, as well as attendants, a supervisor and a rescue team immediately outside the space to help monitor the hazards and entrants until work is completed.

Confined spaces that may exist at a health care facility include tanks, manholes, wells, cold storage areas, pipelines, silos, hoppers, vessels, boilers, reactors, extraction towers, separators, sewers, tunnels, pits, turbines, ducts, water mains, wastewater lines, waste ponds, cooling tower

#### ABOUT THIS ARTICLE

This is one of a series of monthly articles submitted by members of the American Society for Health Care Engineering's Member Tools Task Force.

basins, roof cavities, drains, cargo holds, shafts, gas holders, bulk containers, filter housings, open ditches, vaults, culverts, air handlers, sewer manways, bulk tanks, underground storage tanks and trenches. These also may be designated as PRCSS.

When surveying for confined spaces, it must be determined if each area is a confined space or a PRCs. This can be accomplished through performing a pre-plan confined space assessment walk-through at the facility. A good practice

is to label the confined spaces with bar-coded warning labels after the survey to maintain an active inventory. An example of a confined space pre-plan assessment can be found in the "Confined space assessment" graphic on page 49.

Upon completing the confined space pre-plan assessment, policies and procedures must be developed for the program that include the assessment and inventory, personal protective equipment (PPE) or other equipment required to enter the space, a list of the various roles and responsibilities for confined space workers, and the training and maintenance program for the location.

### CONFINED SPACE ENTRY PERMIT

Confined Space Location/Description/ID Number \_\_\_\_\_

Date: \_\_\_\_\_

Purpose of Entry \_\_\_\_\_

Time In: \_\_\_\_\_

Permit Canceled Time: \_\_\_\_\_

Time Out: \_\_\_\_\_

Reason Permit Canceled: \_\_\_\_\_

Supervisor: \_\_\_\_\_

#### Rescue and Emergency Services-

Hazards of Confined Space	Yes	No	Special Requirements	Yes	No
Oxygen deficiency			Hot Work Permit Required		
Combustible gas/vapor			Lockout/Tagout		
Combustible dust			Lines broken, capped, or blanked		
Carbon Monoxide			Purge-flush and vent		
Hydrogen Sulfide			Secure Area-Post and Flag		
Toxic gas/vapor			Ventilation		
Toxic fumes			Other- List:		
Skin- chemical hazards			<b>Special Equipment</b>		
Electrical hazard			Breathing apparatus- respirator		
Mechanical hazard			Escape harness required		
Engulfment hazard			Tripod emergency escape unit		
Entrapment hazard			Lifelines		
Thermal hazard			Lighting (explosive proof/low voltage)		
Slip or fall hazard			PPE- goggles, gloves, clothing, etc.		
			Fire Extinguisher		

Communication Procedures: \_\_\_\_\_

DO NOT ENTER IF PERMISSABLE ENTRY LEVELS ARE EXCEEDED		Test Start and Stop Time:	
	Permissible Entry Level	Start	Stop
% of Oxygen	19.5 % to 23.5 %		
% of LEL	Less than 10%		
Carbon Monoxide	35 PPM (8 hr.)		
Hydrogen Sulfide	10 PPM (8 hr.)		
Other			

Name(s) or Person(s) testing: \_\_\_\_\_

Test Instrument(s) used- Include Name, Model, Serial Number and Date Last Calibrated: \_\_\_\_\_

CFM-Ventilation	Size-Cubic Feet	Pre Entry Time	<input type="checkbox"/> Central Notified Before Entrance	Time Notified:
			<input type="checkbox"/> Central Notified After Entrance	Time Notified:

A copy of a confined space permit downloaded from the OSHA website.

## OSHA data reinforce need for confined space programs

Not only is a confined space policy the law and the right thing to do, health care facilities simply can't afford to not have this basic program to provide a safer work environment. The following statistics illustrate this point:

- The deaths of workers in confined spaces constitute a recurring occupational tragedy; approximately 60% of these fatalities involve would-be rescuers who themselves were killed. To avoid these and similar situations, the Occupational Safety and Health Administration (OSHA) requires programs, policies, training, inventory, signage, pre-plan prep and more.
- According to the opening paragraph on OSHA's cover page for citation and notification of penalty: "This Citation and Notification of Penalty (this Citation) describes violations of the Occupational Safety and Health Act of 1970. The penal[ties] listed here [are] based on these violations. You must abate the violations referred to in this Citation by the dates listed and pay the penalties proposed, unless within 15 working days (excluding weekends and Federal holidays) from your receipt of this Citation and Notification of Penalty you either: call to schedule an informal conference ... or you mail a notice of contest to the U.S. Department of Labor Area Office ... Issuance of this Citation does not constitute a finding that a violation of the Act has occurred unless: there is a failure to contest as provided for in the Act or, if contested, unless this Citation is affirmed by the Review Commission or a court."
- OSHA has the authority to fine a health care organization in the following dollar amounts for Serious Violations, Other-Than-Serious, and Posting Requirements: \$14,502 per violation; failure to abate: \$14,502 per day beyond the abatement date; and willful or repeated violations: \$145,027.

There are many great tools, tips and business partners that can help organizations develop and implement a confined space program.

One means of offsetting the cost of a confined space program is to reach out to an organization's risk manager to determine if a hospital or health system's insurance provider will partially or fully fund bringing in a vendor to assist with the program. This type of partnership could help an organization quickly and successfully implement a great program. ■

The equipment list may include gas monitors, blowers, blower ductwork, tripods, harnesses, breathing air equipment (e.g., SCBAs, air lines and respirators), hard hats, safety glasses, safety goggles, vests, manhole guard rails, tents, explosion-proof intrinsically safe equipment and radios.

General awareness training for all employees and confined space entry training for workers who will work in and around the confined space must be developed. Confined space training should include eliminating or minimizing known hazards, such as locking and tagging out electrical sources and shutting off valves, blanking and bleeding pneumatic and hydraulic lines, disconnecting mechanical drives and shafts, securing mechanical parts, and blanking off sewer and waterflow.

When health facilities management professionals cannot eliminate the

hazards within the PRCS, filling out a PRCS permit will provide guidance on when a rescue team is needed. A rescue team's only specific duties are to help monitor the safety of the workers and rescue the entrants should the need arise. A local fire department cannot be used as a rescue team because a rescue team must be on-site at the entrance to the PRCS for the entire duration that the space is being occupied.

The health care facility must train the facilities management and any service or construction personnel on the new process and the PPE and equipment involved, including, if applicable, a



While the sign on top only warns that an area is a confined space and may be difficult to enter or exit, the sign on the bottom warns that an area is a PRCS and staff may enter only after filling out a permit, taking identified precautions and having the right team to assist.

hands-on demonstration of using the confined space equipment. This should occur both initially and annually.

An employee should never enter a confined space without proper training, permit approval, equipment and support personnel. There are two different types of confined space training: (1) general awareness training for all employees, and (2) confined space entry training

for employees who will work in and around the confined space. They may not be combined, nor can one replace the other. PRCSs should never be entered without permit approval, correct training and equipment as well as support personnel.

Staff who work in confined spaces are called "entrants." They should be trained to know the spaces' hazards,

including the mode of exposure and the signs, symptoms and consequences of exposure. Facilities managers should use appropriate PPE, maintain communication with the PRCS team, exit the space

**ASHE RESOURCE**

**i** Facilities professionals can learn about the American Society for Health Care Engineering's Certified Health Care Physical Environment Worker program at [ashe.org/education/certified-worker](http://ashe.org/education/certified-worker).

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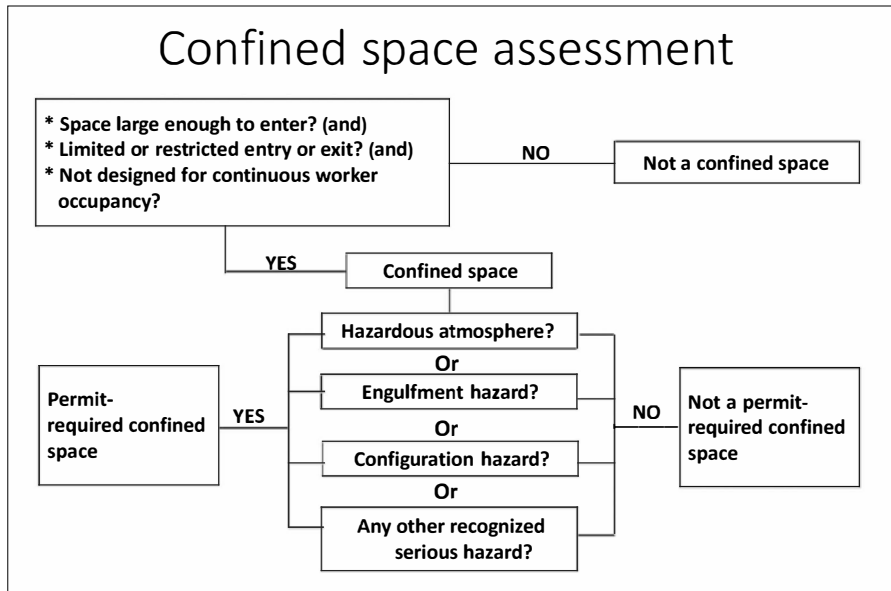
when instructed or when an alarm is activated, and alert the attendant of any hazardous conditions.

Attendants assist the entrants' work, are situated outside the PRCS and are trained to remain directly outside the space unless properly relieved, perform no-entry rescues when specified by employer's rescue procedures, know existing and potential hazards, maintain communication with the PRCS team, order evacuation when any safety concerns arise, summon rescue or other emergency services, ensure all unauthorized persons are removed and not allowed to enter the space, and perform no other duty that may interfere with attendant duties.

The supervisor is a competent person who is responsible for the PRCS operations, is situated outside the PRCS and is trained to recognize hazards and minimize or eliminate them; alerts entrants, attendants and the rescue team of the presence of hazards and warning signs; meets training requirements for all pretesting and continuously monitors work conditions, such as atmosphere quality (using continuous ventilation when possible); signs the permit for the work in the PRCS; is responsible for ensuring the entry operations remain consistent with the terms of the entry permit and that acceptable conditions are maintained; verifies all entrants; maintains worker count by using a sign in/out form; allows only qualified and authorized entrants to enter the PRCS; removes unauthorized entrants; maintains communication with PRCS team; terminates the entry and cancels the permit as required; and verifies that rescue services are available.

Rescue team members are trained to know the hazards of the PRCS and, where a flammable or combustible material presents a fire hazard, station a fire crew in full protective gear with a backup hose line at the entrance to the confined space; wear, store and use suitable and properly maintained PPE; know emergency rescue procedures; are trained in the use of emergency rescue equipment; and maintain communication with the PRCS team.

Any time space conditions change, the team evacuates and then will reassess to determine if the area is safe to work within the confined space.




A decision tree for making a confined space assessment.



Confined spaces that may exist at a typical health care facility.

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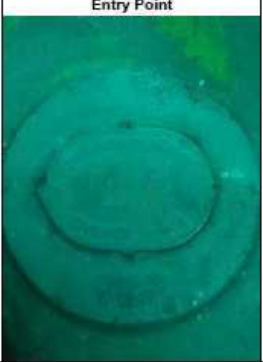


## Penn Medicine

**Confined Space Assessment**


**Confined Space Details**

<b>Site Location:</b> Penn Medicine Asset: DB01 Location: Building, Zone, Etc. Donner: Elevation: Ground Department: Facilities & Safety	<b>Man-way Specifications:</b> <input type="checkbox"/> Square <input checked="" type="checkbox"/> Oval <input type="checkbox"/> Rectangle <input type="checkbox"/> Round Dimensions of Man-way Opening: 24" x 18" Type of Entry: Vertical Obstructions: No Signage: Yes	<b>This Space is Considered</b> <input checked="" type="checkbox"/> Permit Required Confined Space <input type="checkbox"/> Non-Permit Required Date of Assessment: 05/31/2017 Time of Assessment: 09:26 Asset ID:
--	--	---




Entry Point

Image Comments:  
Pump Well



Overview

Image Comments:  
Pump Room



Anchor

Image Comments:  
Tri-pod

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2f51924cd08d07d0-1496237214813

Details of a typical confined space assessment plan.

UPHS confined space inventory				
Space #	Department	Confined space	Location	Permit required?
001	Physical plant	AC B4 air handler unit	Rhoads Basement	
002	Physical plant	Air handler unit	Rhoads Basement	
003	Physical plant	Air handler unit	Rhoads Basement	
004	Physical plant	AC B2 air handler unit	Rhoads Basement	
005	Physical plant	AC B3 air handler unit	Rhoads Basement	
006	Physical plant	DB01	Rhoads Basement	Yes
007	Physical plant	Air handler - roof	Ravdin/White Roof	
008	Physical plant	AC/R-10-2 air handler	Ravdin Roof Top	
009	Physical plant	Fuel oil tank	Ravdin White Basement	Yes

A sample of a confined space inventory.

Confined space training must occur prior to initial work assignment and retraining must occur when job duties change, a change in the permit or confined space program occurs, new hazards are present and/or when job performance indicates deficiencies.

It also is the health care facility's responsibility to ensure that contractors and service vendors can safely perform work within the confined space by reviewing contractor/vendor staff training records, verifying the correct equipment is available and used, and the contractor/vendor has their own permit to enter the space.

An example is a service tunnel that is a PRCS containing a sprinkler and fire alarm system that needs to be tested quarterly or annually by qualified professionals. A new permit is required each time the contractor/vendor must enter the space to perform the inspections.

Health facilities managers and safety professionals can, and should, ask for documentation of training for the contractors entering the confined space. It is wise to require outside contractors to provide and document annual refresher trainings. Health facilities professionals should remember to ask for a copy of the completed, filled-out permit. Finally, contractors should bring their own equipment when working with confined space.

### A vital means

A confined space program is a vital means of ensuring everyone working both inside and out of health care facilities can do so in a safe manner and will go home at the end of the day to return to work another day. **HFM**



**Shadie (Shay) R. Rankhorn Jr.,** SASHE, CHFM, CHC is the senior director of facilities

management at Quorum Health and president of the American Society for Health Care Engineering (ASHE); and **Jeffrey Henne,** FASHE, CHC, CHSP, CHEP, CHFSM, is the safety and emergency manager for the Hospital of the University of Pennsylvania and a past president of ASHE. They can be reached at [srankhorn@qhccus.com](mailto:srankhorn@qhccus.com) and [jeffrey.henne@pennmedicine.upenn.edu](mailto:jeffrey.henne@pennmedicine.upenn.edu).

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## DATA

### 2022 Hospital Construction Survey

Complete survey results can be found online at [HFMmagazine.com](http://HFMmagazine.com).

# 37%

of respondents say their capital budgets for new hospital construction increased from 2021 to 2022.



Source: American Society for Health Care Engineering/Health Facilities Management 2022 Hospital Construction Survey

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Could energy savings give you a little more

# Operating Room →



## **The right energy-efficient upgrades can be vital to the health of your facility—and everyone in it.**

Energy-efficient upgrades do more than reduce energy use, they improve staff productivity and patient experiences. High-efficiency heat pump technology provides better indoor air quality, which is proven to increase productivity and wellness. We have innovative, cost-effective strategies to ensure the health and happiness of your people and patients for years to come.

**Find more opportunities in more places at [ngrid.com/healthcare](https://ngrid.com/healthcare)**

Incentive offers vary by service territory. These programs are funded by the energy-efficiency charge on all customers' gas and electric bills, in New York and Massachusetts per state regulatory guidance.

**nationalgrid**

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# Drywall or FireblockWall™

There's a clear choice: FireblockWall is the first and only reusable one-hour fire-rated system for occupied renovations.



FireblockWall joins a full line of STARC® solutions that can take on any containment challenge and outperform traditional options like drywall.

#### RealWall™

Less noise.  
More stable.

#### LiteBarrier™

Lighter weight.  
Extra durable.

#### FireblockWall™

Stops fire.  
Saves time.

Installs much faster than drywall

Pays for itself in three to five uses

Reusable panels reduce waste

Exceeds ICRA Class IV, ASTM E84 & ASTM E119 requirements

*Meets the new ICRA Class V requirement*

#### FireblockWall

**OPM approved by HCAI | Approved by the Kansas Office of the State Fire Marshal**

**Learn more at [STARCSystems.com](http://STARCSystems.com) or call (844) 420-0329.**



Containment beyond comparison.™

FireblockWall™ is approved by the California Department of Health Care Access and Information (HCAI, formerly known as the Office of Statewide Health Planning & Development, or OSHPD). Save weeks on the approval process by referencing our OPM pre-approval number and following the installation requirements as outlined in the OPM.

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