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# What's Next for Healthcare Facilities in These Unsettled Times?

The Future of Acute Care | Outpatient | Tele-Health
Hospitals | Clinics | MOBs | Retail Medicine | Non-Clinical

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# Today, Tomorrow & Beyond - Senior Healthcare Leader's View of Medical Facilities

*Charles J. Lockwood, MD, MHCM, is SVP of USF Health, Dean of Morsani College of Medicine and a Professor of Obstetrics & Gynecology (Ob/Gyn) and Public Health. Previously, he served as Dean of the College of Medicine and Vice President for Health Sciences at Ohio State, and chaired the Departments of Ob/Gyn at Yale and NYU.*

Dr. Charles Lockwood talked about his experience building a new medical school, USF Health's Morsani College of Medicine, in downtown Tampa. The 13-story, 395,000-square-foot facility was hand-crafted to prepare the next generation of doctors, something the area increasingly needs because of its disproportionate over-65 population.

"Folks over 65 use healthcare about five times more as folks under 65," Lockwood said. "We were already under-doctored and under-nursed. This is becoming an acute shortage."

**Get ready for telehealth:** USF Health was already preparing for a future in which telehealth was commonly issued. But COVID-19 accelerated that timeline. USF Health has had roughly 250,000 telehealth visits since the start of the pandemic. Usage of the medical system's telehealth services increased almost 40-fold since March 2020.

"We will continue to refine these platforms so they become more and more robust," he said. "We want to be able to use artificial intelligence to warn us when Mrs. Jones, who lives in Wyoming, is having a problem and to alert us that we have to intervene."

**Health disparities matter:** COVID-19 exposed just how strikingly different health outcomes were among various racial and geographic-dwelling groups. People with heart disease and diabetes who contracted coronavirus were far worse off than those who didn't — and certain groups already have a predisposition for those diseases.

"It certainly was gratifying to finally see that the nation woke up and said, 'Hey, what's going on with this? COVID laid bare the extraordinary inequities in health outcomes."

While racial disparities are the oft-discussed issue, rural disparities are "almost worse,"

"We can fix access in the inner city, but we can't easily fix access in rural areas," he said. "Half the counties in the United States have no obstetrician. If you deliver a baby in rural Nebraska, you have a much higher rate of the baby dying or you dying than if you deliver in Harlem."

**Medical ignorance is a problem:** The risk of not understanding medicine is clear for the consumer. People who are not proficient in health literacy have more hospital visits, longer hospital stays and a four-fold increase in overall cost than those who are.

"Getting patients educated to understand their conditions and what needs to be done is a big part of what it takes to be a modern physician."

**The increasing cost of care:** The United States spent a total of $3.8 trillion on healthcare in 2020, coming out to $12,530 per person. 20% of our Gross Domestic Product is made up of healthcare versus an average of 11% in the European Union.

Most of the increase in spending comes from the escalating cost of drugs, Lockwood said. Hospital and provider costs match the consumer price index. Healthcare drugs do not. "What do you want to give up? Your Moderna vaccine? Your Pfizer vaccine? The new anti-COVID drugs? The new cancer drugs?" he said. "I'm not a shill for pharma by any stretch of the imagination, but you have to give the devil their due. This is a pretty remarkable set of achievements."

**Staying resilient for a different environment:** A changing climate doesn't just mean hardening buildings for an uncertain future. It's about preparing for different diseases. Changes in the environment mean more common occurrences of illnesses that come from floods and natural catastrophes, like heat stroke, or infectious diseases, like arboviruses.

Healthcare also needs to look at its own carbon footprint. The industry is responsible for 10% of carbon emissions in the United States. "We could clean up our own act in a very significant way," he said. USF's Morsani College of Medicine made an innovative design choice by creating ship-inspired bulkheads that could store electrical equipment and ensure the building could function in storm surges of up to 21 feet.

**The risk of cybersecurity:** Cyber-attacks cost hospitals billions annually. It's a huge challenge to hospitals to keep their information secure and yet make it readily available to providers

**Collaboration is key:** The best way to reduce errors and prepare medical students for the future is to teach them how to work together, according to Lockwood. One of the primary changes he instituted when coming to USF Health is reducing lectures from 40 hours a week to less than 12 hours and focusing on "small, active, case-based learning."

"We treat each other with respect. We need each other desperately," Lockwood said. "By the time students graduate, this is the norm. They understand how critical teams are in healthcare. We create an environment where burnout is less likely."

**Information is being created at the speed of light:** When Lockwood graduated from medical school, medical information doubled about every 20 years. More recent estimates now say that medical information doubles every 73 days.

"When we began designing the medical school, that was my mantra," he said. "Our brain's neurochemistry cannot keep up in any way, shape or form with the pace of accelerating medical data. We have to accept the fact that we're going to have to embrace AI."

The future of medical learning is more about curating information and making sure it's accurate rather than constant memorization.

# The Art, Engineering, Management and Economics of Prefabrication and Modular Construction of Medical Facilities

*Larry Arndt, Senior Director, Barton Malow Builders*

*Elizabeth Geiser, Director Preconstruction, Barton Malow Builders*

*Andrew Jennings, MEP and Prefab Manager, Haselden Construction*

*Jim Thomson, Vice President, HDR*

The task was clear: create a medical district with a 640,000-square-foot hospital, 100,000-square-foot medical office building and an attached parking structure for the SCL Health System in Denver, Colorado. The terms made it a bit harder — the owner's top concerns were speed and budget, two factors that sometimes work against each other. Those demands led the team to choose prefabrication construction as the best way to accomplish the building in a set time frame and set dollar amount.

**Where should we brainstorm?** The team quickly created an on-site manufacturing facility. Although the land totaled 20 acres, that space was taken up as buildings started to form. To keep the collaborative atmosphere going, the group assembled a "big room complex" in trailers where planning could happen each day.

"Our design team members, our construction team and owner were all working together," said Arndt of Barton Malow. "That's what was really driving the modular and prefabrication aspects of the project—that desire to work together to come up with lean concepts."

**The art of the prefab matrix:** "As the construction manager, we carried this matrix and started off with all of the concepts that we have seen in the market for prefab and modular construction," said Jennings of Haselden. "We had cluster groups for interiors, for prefabrication, for mechanical electrical systems, and we assigned concepts to those groups to vet out ideas and see if they were feasible. Along the way, we started to be able to track some of the ancillary items, like were there cost-savings and whether it would add or deduct time from the project schedule."

**Decide before you build:** Early on, the team decided that they would manufacture what they could offsite. "You have to make that decision on day one, as the owner, design team and construction team," said Thomson of HDR. "If we had made that decision six months down the road, when we were already done with our design, we'd have to start all over again."

**Does your client want to innovate?** Prefabricated operating rooms were "a fairly untested item in the marketplace," according to Jennings. That was one of the conversations they had to have with their clients.

"Do they want to be first?" he said. "How far do they want to go with that innovative approach?"

**Some things won't work out:** One of the team's goals was to prefabricate an entire patient room that could be replicated for any of the company's medical complexes. But logistics made that difficult.

"Trying to move a room that is literally 14 feet tall across the country with overpasses — it just wouldn't work," Arndt said. "There were certain things that just didn't make it to the project because of concerns over its newness or the inability to get it there logistically and fit within the budget."

**Beware the supply chain:** The team made sure to check on certain materials before they planned a design. If they knew there was enough tile in stock for 192 patient bathrooms, then they factored that into their decision-making process. That helped them stay on track for their project timeline.

**Have outside help:** Conflict will always arise when you're working with a team of people. The key is to stay on top of it and not be afraid to ask for help.

"We utilize a clinical psychologist that's employed by our company," Arndt said. "Once a quarter, they come out and do team health assessments to see how well the team is doing. We're above all the metrics, and that's why we're successful."

# How PDC & Facilities Collectively Met the COVID Challenge in 160 Hospitals

*Mark Schultz, Regional Director, Tennessee / St. Thomas Health Ministry, Medxcel*

An insider look at how the team responsible for over 160 hospitals and 2,600 care sites responded to COVID-19

When COVID-19 hit the hospitals in Tennessee (and other states), employees went into overdrive mode. "We were stressed out at every level of the organization," said Schultz. "Sometimes people at those stress levels don't make the best decisions."

**Isolation rooms:** Prior to the pandemic, each hospital had about two isolation rooms per unit. At one point, they even added a third. "For years and years, we patted ourselves on the back. We were really proud of ourselves."

Once COVID-19 broke out, it became clear that two isolation rooms were not enough. One solution was to create negative pressure rooms, where contaminated air would flow into exhaust pipes and new air would still filter in.

**Prepare for the unexpected:** One of the hospitals in Schultz's coverage area, St. Thomas Hospital Midtown in Nashville, delivers about 7,500 to 8,000 babies a year. They wanted more isolation rooms in case two COVID-positive went into labor at the same time. Schultz was initially skeptical.

"What are the odds of two women going into labor simultaneously that are both COVID-positive?" he said. "It's actually pretty high. We've had three or four simultaneously COVID-positive women giving birth at the same time."

**The parking lot became a medical space:** The team was forced to use spaces in innovative ways, like parking lots. The parking lot became a triage center for COVID-19 patients to get tested and treated. "We would have never done this for any other healthcare practice two years ago," he said.

**Where to don and doff PPE:** Schultz knew that healthcare professionals had to have a designated area where they could don and doff their personal protective equipment. Not only was this good for safety, but it gave doctors and nurses a chance to "drop their shoulders, sit down and catch their breath," he said.

**Focus on shared team values:** Imparting to the entire medical system that everyone had the same goal — to support the delivery of patient care — went a long way to creating a team-like mentality. "Their goals were our goals," Schultz said. "It's my job to make sure the clinicians that are taking care of the patients are doing so in a safe environment, unencumbered by the environment and undistracted while they're doing that."

**Time is of the essence:** As the pandemic ushered in changes at the blink of an eye, Schultz directed his team to be able to respond quickly, sometimes as soon as within hours.

**Temporary changes that became permanent:** "Here we sit two years later, and COVID is part of everything we do every day," Schultz said. "A lot of the things we put into place as permanent measures."

# Solution Spotlight – Reusable Containment Solutions

*Hope Chalmers, Regional Sales Manager – Southeast, STARC Systems*

A simple curtain between patients was no longer enough once COVID hit hospitals. STARC Systems, a temporary wall manufacturer, stepped in when medical centers needed a quick solution to create divisions between different units.

**Create a product that works and can pivot:** STARC Systems created a special sliding glass door system that enabled hospital staff to assist patients without stepping into their room. This quickly took off.

"Infection preventionists really believed in our ability to create airtight spaces to contain what used to be just debris and noise and now was pivoting to a complete isolation solution," Chalmers said.

**Forge connections to work fast:** When a hospital in south Florida reached out asking for five ICU rooms to be fitted with temporary walls in 24 hours, she had to work fast. Luckily, she had a rental partner in South Florida that stepped up. They had five containment rooms constructed overnight.

# Future of Healthcare Real Estate

*Mervyn Alphonso, Executive Vice President, Anchor Health Properties*

*Anthony Forgameni, Director of Development, Optimal Outcomes*

*Thomas Wittenberg, Vice President, Realty Trust Group*

**Behavioral is the new buzzword:** More and more health systems are adding behavioral health to their list of services, according to Alphonso of Anchor Health Properties. Roughly a third of all emergency room admissions are behavioral in nature, not physical, Alphonso said.

**All we offer under one roof:** Healthcare providers are more likely to create flagship locations where almost every service — whether that's orthopedic work, a surgery center or CT scans — can be offered under one roof, said Forgameni.

"We're seeing specialty facilities consolidate a lot of different groups under one roof," Foragemeni of Optimal Outcomes said. "Patients are much smarter today, and they want more convenience."

**Behold the life sciences:** On the research side, businesses are looking to install wet labs and vivariums, said Wittenberg of Realty Trust Group. "That's being driven by precision medicine," he said. "Personal medicine and new technologies — health systems are looking at investing in that."

**Outpatient surgery centers:** Physicians are increasingly doing surgeries in an outpatient setting. A survey sent by Optimal Outcomes to physician groups indicated that 80% said COVID-19 heightened the move of surgeries from inpatient to outpatient.

**What do you own?** Hospitals need to determine what land they own — that's a big part of the work Wittenberg does. "We say, 'Let's just do an analysis of what you own and figure out what's strategic and what's not. People are passing away and donating their real estate portfolios," he said. "You have to note the current state and then figure out the strategy."

**When should physicians invest?** Optimal Outcomes works with physician groups who don't know whether they want to own or lease. He generally recommends owning real estate in healthcare but notes that there are inherent challenges in the landscape.

"Physicians love to invest in real estate until they have to write a check," Alphonso said. "We don't really need physicians' money, but we like joint ventures because it creates alignment over the long-term."

**Make sure you have the land first:** "The hardest thing right now in Florida is to find land," Forgameni said. "You can't really start planning and bringing in the architects until you know what the land looks like. Figure out that piece, and then bring in a team to design it around that piece of land."

# Clean Air - Applying Lessons Learned from the Pandemic

*Dave Blackwell, Director of Healthcare, Camfil USA*

*Joe Randolph, Director, Central Branches, Camfil USA*

**Filters can be tested:** Patients now have the right to ask for an ASHRAE compliant test report. That means that testing of filters is now required. "This is a big liability issue for hospitals now," said Blackwell. "Imagine how bad things could be if Granny died from COVID in your hospital and Granny's family found out that you weren't using compliant filters in your hospital."

**Droplets are our best friend:** The size of COVID — about 0.1 to 0.2 microns — makes it difficult to catch in an air filter. But the fact that it attaches to droplet nuclei coming from our noses and mouths makes it a lot easier. "Droplet nuclei are much larger and easier to filter," Blackwell said. "A HEPA filter can clean that air up pretty well."

**It's all about risk:** *Hospitals need to make air filtration decisions based on what amount of risk they can tolerate.* "When you take a look at patient risk, we should be looking at high efficiency filtration to mitigate that risk, because the last thing we want is hospital-acquired infection," said Randolph.

# Avoiding Regulatory Traps in Clinics, Ambulatory Centers, and MOBs

*Jim Peterkin, Principal/Life Safety Consultant, TLC Engineering Solutions*

*James R. (Skip) Gregory, NCARB, President Health Facility Consulting, FGI Health Guidelines Revision Committee Member*

**Separate your waiting areas:** Ambulatory surgery centers must have separate waiting areas, according to Peterkin. "They will be cited and have to go back and add a separate waiting room after the fact," he said.

**Sprinkler requirements are key:** If there are four or more people incapable of self-preservation, sprinklers must be located on the floor of the ambulatory center.

**Don't put an ambulatory surgical center inside of a hospital:** This is an absolute no-no in Florida, according to Gregory. "You have to walk outside and go back into the hospital in order to have a surgery center connected to and in any way touching the hospital. You can have a covered walkway, but don't enclose that walkway."

**What is an operating room?** The total square footage required for an operating room in an ambulatory surgery center started as low as 170-square-feet and has been as high as 400 sq-ft before coming back down to 270 this year. "We haven't made up our mind about how big an operating room has to be in an ambulatory surgery center," Gregory said.

# Untangling the Supply Chain

*Mitch Green, Healthcare Pre-Construction Executive, AECOM Tishman*

Dealing with the ever-changing supply chain is never fun. But dealing with it in perpetuity? That could be our future, said Green. "It's gonna last and it's gonna last for a long time. Geopolitical events are not helping."

**Pro-active vendor monitoring:** Green quickly learned that monitoring how far out vendors were on certain products was helpful even before a project started. "We really had to think about how we build buildings, starting with the completion and going backwards towards the beginning," he said. "We now have an up-close-and-personal relationship with subcontractors and vendors and vendors' vendors looking at where we are on lead times."

**If the cost is too great, pay more:** Sometimes, the loss of not opening an ambulatory surgery center or an outpatient orthopedic center is higher than the cost of putting the space together. That made it easier for clients to go out on a limb and spend more money.

"Working with our clients, we began to push a little bit farther down on the cost," Green said. "Maybe the cheapest thing isn't the best. The cheapest thing is to get you the air handler and spackle that gets this place opened first."

**Wait on acceptance testing:** Because of long delays, Green's team eventually decided that equipment could be installed in part before the full factory acceptance testing. "If we're all sitting here not being able to do the testing because that thing hasn't arrived from Taiwan, what we're finding in certain instances that our clients are saying, 'Take the big widget, put it in the building, as soon as the chip or controller shows up, we'll deal with it,'" Green said. "This way, we can get the construction going a lot faster."

**The key word is prefabrication:** The best way to speed up a project was to use prefabrication. "When you finally get the things you were waiting for, the building owner wants to know why it's not done tomorrow," Green said. "Prefabrication can shorten on-site time."

# Physical & Cyber Security - Battling the two front assault on medical facilities

*Frank Finley II, PSP, Physical Security Consultant, Force Protect*

**Bring in security before you design:** "When you start and you find your land, it's time to bring in the security consultant when you bring in the architect and the engineer," said Finley. "The majority of our clientele bring us in too late."

**A true security risk assessment:** "A true security practitioner does not go in and say, 'Hey, you need locks on your doors.' That's nonsense," Finley said. "A true security practitioner tries to assess the threat." That might include having a security clearance and access to classified data.

**Be on the ground:** Any security consultant you hire should plan to be on the ground and get a look at the entire complex. "You have to put eyes on it, even if the facility is not built yet. Potential threats are not going to be a "crystal ball," but they may be stunningly accurate. "It's quantitative and qualitative analysis that helps you make data-based decision-making on how you conduct your design."

**Put a dollar value on it:** Make it clear how much the security could save down the line if you want your clients to go ahead with a full system. "You don't want to have to go to the client and say, 'We have all this stuff and it's going to cost all this. And the client says, 'How can we trim the fat? By default, some people tend to look at the security measures. You need to get some folks to put skin in the game. Is it worth it to you the impact of the loss?"

# 2022 FGI Guidelines Update - What's changed from 2018

*James R. (Skip) Gregory, NCARB, President of Health Facility Consulting, FGI Health Guidelines Revision Committee Member*

**Errata must be noted:** Make sure you check the errata for the most recent FGI Guidelines, as things get changed between decision and publication, says Gregory, Find errata and addenda at https://fgiguidelines.org/guidelines/errata-and-addenda/

**Alternate method of compliance:** "There are times when you can achieve the same goal with a different process. And that's typically called in the codes an alternate method of compliance. We never had that particular statement in the guidelines, we alluded to it, but we never had that statement. That's a statement that's in the guidelines."

**Changes to acoustics:** The noise reduction coefficient has increased and footfall vibrations have been reduced. "That's been a problem, especially in outpatient buildings where you have steel building construction and it's very difficult to meet the vibration requirements in the guidelines without doing a whole lot of extra expenses and structural additions," Gregory said. "I don't know if it's going to fix that or not."

**What's a device?** Do nurses have to have a call station or can they use radio frequency systems? The new guidelines say they can use either, but Florida isn't too keen on this change and may not adopt it, according to Gregory.

**What version will Florida adopt?** Florida has adopted the first edition of the 2018 FGI Guidelines, but not the second edition. They will likely adopt the second edition soon, said Gregory, but the state's adoption process will be finished before the 2022 FGI Guidelines are ready to be adopted. "Florida will not adopt the 2022 edition," Gregory said. "We're skipping it. But Florida will adopt some things, like the second edition of 2018 FGI Guidelines."

# Designing Flexible and Sustainable Hospitals

*Doug Armstrong, Director Facilities, Advent Health/North Pinellas and Healthcare Construction Consultant*

*Tracy Hunt, Senior Vice President, Skanska USA Building*

*David Martin, AIA, NCARB, LEED BD+C, Principal/Director of Architecture, FreemanWhite*

*Everet Simmons, Director of Design and Construction, Moffitt Cancer Center*

*Moderator: William J. Hercules, FAIA, CEO, WJH Health, Past-President, ACHA*

**What is the definition of flexibility?** Some, like Everet Simmons, director of design and construction at Moffitt Cancer Center, define it like this: "The flexibility that my administration expects is: change the facility to whatever I want, whenever I want it, right away, for no more money."

**Bring us in early:** But oftentimes, flexibility can be a challenge when navigating any facilities project. "We're brought on in a lot of cases once things are pretty set," said Tracy Hunt of Skanska. "What can we do at the beginning to make the building more flexible? The best way to get ahead of this is to bring a design firm on and a construction management firm on and create a cohesive team right at the beginning."

**Translate for the C-suite:** "Sitting between the architect and the contractor and translating to the C-suite — it is a challenge," Simmons said. "You want to move quickly in a way that is easy to do and affordable. We often try to think about the problem that's going to happen in year 56."

**Sustainability and budget:** Do all healthcare facilities need to harden for a climate change-filled future? "A lot of this comes down to budget constraints," Hunt said. "Are you paying for a certification? From our perspective, a lot of these decisions that are probably the right decisions really come down to budget."

**Playing catch-up:** "I think the hospital facilities are playing a little bit of catch-up," said Doug Armstrong of Advent Health. "When we replace a piece of equipment, we are looking at what is going to provide us with the best energy solutions. We're looking at air quality and water consumption — all these things are taken into consideration when we start replacing this equipment."

**Maintain these tenets:** "We kept bringing it back up to four main tenets that were going to allow any department to be flexible: looking for the protection and safety of the patient, making sure the family and patient are comfortable and addressing that the patient was treated with dignity and respect," said David Martin of FreemanWhite.

**Younger employees are driving sustainability focus:** "I'm really hopeful. What we're seeing in our industry is our younger employees are really driving this," Hunt said. "I think it's going to start to become more and more. We're already looking at it. By 2045, we want to be carbon net zero. By 2030, we want to reduce the emissions that we control by 50%."

**Which path will it be?** What will drive the market towards more sustainability in building practices? "Nobody wants to put in something that's not sustainable. Everyone would choose sustainable and efficient building systems if they could afford it," Simmons said. "Is the market going to drive those products to where they're affordable or are we going to get mandated to do it first and will that drop the price?"

**Eat the elephant one bite at a time:** "Our hospitals serve a component in our society that they're burdened with — that's care for the indigent. When you think about other industries, they may not have those burdens that we expect them as a community to address. They can do what they want to with their funds," Martin said. "Healthcare is behind. How do you eat an elephant? It's one bite at a time. Maybe in your next project, decide what element of sustainability we are going to incorporate here. We can't do it all, but let's at least do something."