Supporting our healthcare clients to implement programs/projects associated with a Safe Return to Operations and implementation of initiatives designed to support a phased Return to Service.
Over the last decade, sustainability has gone from an expensive overlay to the core of the design of most new buildings: We know the benefits of healthy environments on occupants and the savings we achieve through high performing buildings.

The recent pandemic has raised public awareness to airborne contaminants and as a result we are discussing solutions for high occupancy venues such as arenas, stadia, convention centers, and entertainment parks.

Our understanding of the novel coronavirus continues to grow and design solutions will evolve. There are, however, some initial strategies that should be considered in the design of new healthcare facilities.

In order to return people to healthcare facilities, immediate steps should be taken to create a safer environment. These steps are based on examples of practices that could be implemented in relation to the spread of coronavirus based on CDC and WHO guidelines. A successful return will rely on addressing individual and group behaviors as well as healthcare culture.
Reset traditional Building Systems thinking:

Maximize the Outside Air
In a similar way to the once-through ventilation strategies used in critical medical facilities and laboratories, maximizing the outside air provided to any occupied zone mitigates the compounding effect that air recirculation can have on virus spread. While local environmental conditions will determine the impact this may have on the overall building energy consumption, this should be seen as a fundamental recalibration of the baseline from which energy conservation and onsite generation strategies are based rather than an option to be gamed. In some parts of the country, where economizers are already required, this becomes more of an operational cost discussion, where in other geographies this would be a significant change in design strategy.

Introduce or Retrofit Hardware for Touchless Technology
Motion sensors for door opening/closing, light fixtures, plumbing fixtures, and anything else we touch with our hands should be touchless.

Displacement Ventilation
Deployment of a close to the floor, displacement ventilation system provides fresh, outside air directly to the occupied zone, and as acknowledged by ASHRAE, induces air particulates to follow the thermal gradients and be drawn away from the occupants and their neighbors.

Traditional thinking when responding to airborne contaminants in a laboratory environment involves the deployment of a laminar flow ventilation solution. While this may work in low activity spaces, it is acknowledged that people movement within laboratories significantly impacts the effectiveness of the solution, with the disruption of containment boundaries by people walking through them being a known issue. This is usually mitigated by other SOPs or barriers (doors).

Transitioning this approach from the lab to healthcare spaces would not only be extremely difficult to implement within the existing infrastructure, the inherent level of movement is likely to exacerbate the issues seen in laboratories. If we therefore step back and look at alternative ways to reduce mixing and expedite the removal of the airborne contaminant, flipping this thinking on its head and taking an “up and away” displacement approach may be more viable and provide similar benefits, allow us to take advantage of the natural buoyancy, and be less impacted by people movement.
Enhanced Filtration Touchless
Deploy advanced filtration that combines both physical filtration media and UV-C filtration within the building's centralized HVAC systems. To further enhance the air filtration, distribute local ceiling mounted air purification systems within both open workspaces and collaboration spaces. The integration of additional air changes, and local UV-C filtration, can further reduce the propagation of airborne viruses.

- Increased Separation
  Initial research suggests that there is a risk of pathogen transmission from the waste piping system to air streams when routed in the same risers. It is therefore recommended that every effort be made to separate plumbing and HVAC risers, to reduce this risk.

- Maximize Building Smart Technology
  Workplace technology can be utilized to monitor, control, inform and generally empower the occupants. In response to the new normal, it is anticipated that smart workplaces will become commonplace, with occupants not only wanting to understand if a conference room is open, but who was in it last and the current air quality metrics.

- Vertical Transportation
  As noted above, vertical transportation within buildings is one area that inherently leads to high occupant density. Through the use of smart technologies; reductions in maximum occupancy that is driven by air quality rather than weight; the deployment of anti-microbial surfaces and the integration of UV-C air purification within each elevator cab are all strategies that are likely to be explored within the new normal.

- Anti-Microbial Materials
  Deploy anti-microbial surfaces and materials throughout the building as a standard basis of design.
As people return to healthcare systems for the care they need, there are many services that can only be delivered at a hospital. These include emergency care, imaging, surgery, and inpatient care services, and many Centers of Excellence such as cancer, cardiovascular, neurosciences, women’s health, neonatal intensive care, pediatrics and more. The environments that house these needs to change.

Many of the above Healthy Building recommendations are applicable to healthcare facilities. These range from the pragmatic to the strategic. In addition to the potential building systems changes, immediate needs include:
Social Distancing

Signage and Wayfinding
Wayfinding is a critical activity that happens as you arrive at a facility. Signage is key to directing people to the right parking and entrances. Does this need to change? Things to consider:

- Will parking lots be designated for different people?
- Will certain entrances be used for well people and others be used for coronavirus patients?
- Will there be specific discharge locations?
- When you enter a facility, where do you go?
- Who will you meet?
- What are the required paths you need to take to get to where you’re going? Will signage need to be added to help you on your journey, or will you be required to use an app on your phone to guide you to your destination?
- All facilities will need to go through a mapping process to determine the desired flows of patients, guests, staff and supplies to ensure safety for all.

Waiting Rooms
Waiting rooms will need to be reconfigured to maintain proper distances by people waiting.

- Communication between staff and patients needs to be reviewed and new processes are likely to be required.
- Bringing family members to the hospital will be limited and discouraged.
- Registration areas will need to be physically separated to protect staff and patients.
- The bigger question is whether waiting rooms are needed, or can people be scheduled to arrive at specific times in order to minimize or eliminate them altogether.

Areas of Congregation
Other areas of congregation should also be evaluated:

- Will nurse’s stations require reconfiguration?
- Will staff break areas need to be developed?
- Will cafeterias need to be subdivided?
- How will conference rooms be used going forward?
Safety

Safety and Security
While safety has always been a focus of healthcare facilities, new levels of concern need to be addressed:

− Should security be located at every entrance?
− Should everyone be thermally screened as they enter the building?
− Should everyone be given PPE as they arrive?
− How are instructions for visiting the hospital communicated to people when they arrive?

Infection Control
New contamination tests will be needed, and new protocols developed for infection control.

− Should anti-microbial materials be installed to replace existing?
− Should everything be made hands free (touchless)?
− Should furniture be re-upholstered or replaced?
− Will different cleaning equipment and processes need to be developed?

Circulation
Existing circulation typically allows most people to share the same space. An evaluation should be done to see if there are ways to separate staff traffic from public traffic. In some cases, a simple designation may improve safety for all users.
Space Utilization

The expectation is that the coronavirus will be around for a long time before a vaccine is developed. This will affect how space will be used in the near term. One of the significant changes that has affected healthcare delivery is the use of telemedicine or virtual healthcare appointments. As a result, many medical office buildings are under-utilized and may remain so for a long period of time. Should these be reconfigured to support this change? An example is a move to creating spaces for physicians to hold virtual patient meetings in a professional manner. Providing appropriate support spaces for this function will also be necessary.

Many other areas of hospitals will be underutilized. Until recently, many emergency departments were designed to accommodate volumes of patients based on current utilization projections. Recently, many EDs are working at less than 50% capacity as a result of people not wanting to come to the hospital for fear of contracting the coronavirus.

Key considerations include:
- Will this return to historic levels or will this become the new norm?
- If this remains the same, what do you do with the existing space?
- What other spaces throughout the hospital are underutilized and can be re-purposed?
While the desire for flexibility in healthcare facilities has been a goal for decades, it is clear that the need for extreme flexibility is at hand. This begins with the real-time analysis of patient needs, followed by the real-time deployment of required staff. An evaluation of existing facilities through the lens of universal space will allow the development of alternative uses, depending on the needs at the time. This should happen from the room-by-room level, to the department level, to the hospital-wide level.

Understanding that a resurgence of the coronavirus is a possibility, healthcare systems need to anticipate this while they can, before it becomes a reality. Reviewing existing campuses to determine where there are locations to erect temporary facilities, and how these can be supported, is essential. Typical Medical Office Buildings are developed as lower tier healthcare facilities with limited diagnostic and treatment services, and no inpatient care capabilities. Evaluation should be done to see how these can be upgraded through the use of temporary or plug-and-play components that would allow them to stretch their usefulness.
Healthcare Leadership

Rebecca Nolan
Executive Vice President

Rebecca Nolan has more than 30 years of experience and leadership skills in strategic planning, programming and design for corporate, healthcare, federal, high technology and education clients. Rebecca has managed and designed major healthcare projects throughout her career. Most recently, she led AECOM’s initiative for the design of alternative care facilities for federal, state and city clients addressing the novel coronavirus. Experience includes:

- Alternate Care Facility for USACE, SUNY College of Old Westbury, Old Westbury, NY, 1022 beds
- Three Alternate Care Facilities for the State of Rhode Island, 550 beds, 335 beds, and 525 beds
- Alternate Care Facility for USACE, The Ranch, Loveland, CO, 1000 beds
- Alternate Care Facility for USACE, Music City Center, Nashville, TN, 390 beds
- Alternate Care Facility for USACE, Commercial Appeal Building, Memphis, TN, 402 beds
- BJC Healthcare and Washington University School of Medicine Campus Renewal Project, St. Louis, MO, 453 beds.
- National Institutes of Health, “A” Wing Addition to Building 10, AIDS Research Laboratory, Bethesda, MD, 55,700 SF.
- Rush University Medical Center, Chicago, IL, 800,000 SF.

Greg Mare, FAIA
Director of Healthcare Planning and Design

As Director of Healthcare Planning and Design, Greg Mare brings 40 years of experience as an innovator and expert in healthcare planning and design. His experience includes major projects for healthcare systems such as Cleveland Clinic, OhioHealth, and Cincinnati Children’s, as well as national clients including Kaiser Permanente. Most recently, Greg provided medical planning for these design-build coronavirus-related facilities:

- Alternate Care Facility for USACE, SUNY College of Old Westbury, Old Westbury, NY, 1022 beds
- Three Alternate Care Facilities for the State of Rhode Island, 550 beds, 335 beds, and 525 beds
- Alternate Care Facility for USACE, The Ranch, Loveland, CO, 1000 beds
- Alternate Care Facility for USACE, Music City Center, Nashville, TN, 390 beds
- Alternate Care Facility for USACE, Commercial Appeal Building, Memphis, TN, 402 beds
- Geisinger Health System Central Region Strategic Facilities Master Plan and Related Studies, Danville, PA
- State University of New York Upstate Medical University, Institutional Strategic and Facilities Master Plan, Syracuse, NY
- UCSF Medical Center at Mission Bay; San Francisco, CA

Leslie Sims
AIA, LEED AP
BD+C
Associate Principal, Science & Technology

Leslie has dedicated her career to architectural planning and design for science, engineering and technology projects. With over 30 years of experience, her focus has been on highly-specialized research spaces and advocating for a variety of clients including Harvard University, Brigham and Women’s Hospital, MIT and Washington University. Leslie’s experience also includes:

- Virginia Commonwealth University, Massey Cancer Center, Richmond, VA.
- Tufts Medical Center/ New England Medical Center, Boston, MA. Renovation of the Ziskind Building and Renovation of Boston Dispensary for Department of Laboratory Medicine
- Dartmouth College Medical School, C. Everett Koop Medical Science Complex Programming and Concept Design, Lebanon, NH.
- Wentworth Institute of Technology, The Center for Sciences and Biomedical Engineering, Boston, MA.
- Brigham and Women’s Hospital, Brigham’s Building for the Future, Boston, MA.
- University of New England, Doctor of Osteopathic Medicine School, Biddeford, ME.
About AECOM
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July 2020