IMEG

DESIGNING YOUR MOB FOR A PATIENT SURGE EVENT

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Getting back to normal functions will be the top priority for many healthcare facilities once the COVID-19 pandemic subsides. But a new definition of "normal" will impact the design and construction of these facilities, including medical office buildings (MOB).

Owners of existing or planned MOBs may want to add features that can better prepare these non-acute care buildings for future patient surge events, enabling them to be converted into an alternate care facility quickly and efficiently. Flexibility, proper services, and protection for patients and staff will need to be integrated with basic building design and system and infrastructure enhancements.

While each MOB and healthcare organization will have its own unique needs and characteristics, the following discussion is intended to provide a high-level outline of the key design considerations that are universal for any project.

General planning

When planning for future disasters, it's impossible to know exactly how a facility will be used and what the level of patient acuity will be. Additionally, building codes, health requirements, and owner needs could all change in response to the pandemic. But when preparing a facility for the "what-ifs," it's important to evaluate specific infrastructure systems and what changes could add future flexibility.

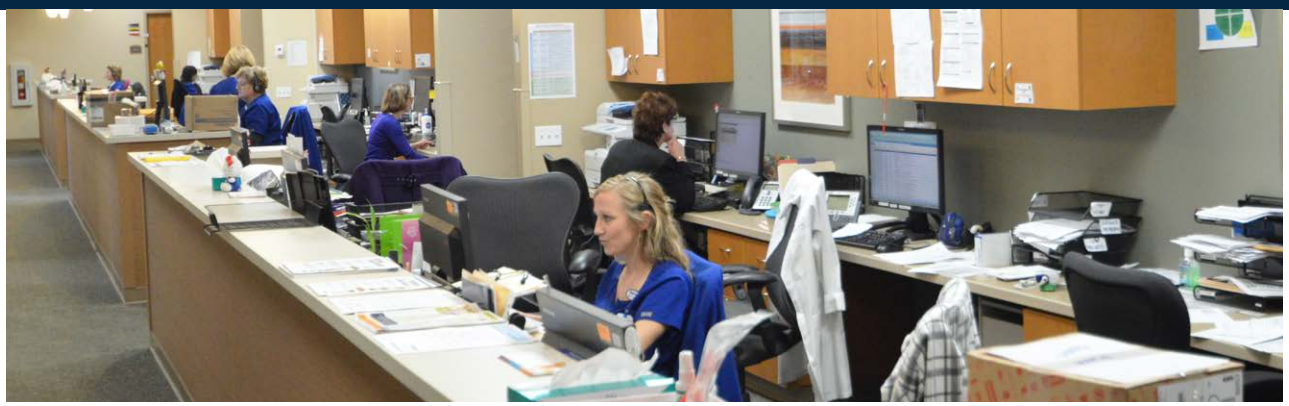
Consider a typical MOB that has been designed and developed many times throughout the U.S. in the last 10 years. It includes:

- 60,000-sf to 100,000-sf over multiple levels
- Business occupancy
- HVAC using plenum return
- Very limited nurse call
- No emergency power
- Moderately robust IT infrastructure and charting capabilities
- Limited exhaust/outside air
- Very limited or no medical gas system
- Blood draw and stat lab (most lab and all pharmacy functions occur off site)

The facility owner will need to weigh the cost of infrastructure updates in their MOB with the needs of their other facilities, evaluate their overall disaster/pandemic response plan, and determine the associated values and risks to make strategic decisions.

Some of the big picture questions should include: How will this facility be used to assist in a future pandemic, and how will it be staffed? What type of patients may be seen? How will this facility be kept in supply with the required items to function?

When used as an alternate care site, consider if the lobby or corridors can be used for patient intake and triage areas.



Preparing an MOB for a patient surge event should include adapting a space for a facility command center.

Working closely with the design team, the owner should have general planning discussions about the following:

- Dedicated space for personal protection equipment (PPE) distribution near the entry/lobby
- Space for a facility command center
- The layout of the lobby and corridors when used as an alternate care site. Where will patient intake and triage areas be located? Can patient and staff entries be separated?
- At least one elevator sized for a stretcher
- Auto operators for key exterior and interior doors minimizing patient contact with high touch surfaces while at the same time being used for area pressurization, security, and access control
- Additional toilets
- Provisions for temporary showers and handwashing stations
- Dedicated, secure areas for the delivery, storage, and distribution of supplies (food, clean and soiled holding room, and medical supplies)
- Provisions for connection of portable imaging equipment

As the planning progresses from this general discussion, the design team will consider the electrical, mechanical, and technology system requirements.

Electrical systems

The design and functionality of the electrical system will be a key component for the effective operation of an MOB in a disaster or pandemic scenario. Virtually every piece of medical equipment and all computers require a source of power. The building infrastructure – heating, cooling, ventilation, domestic water distribution, sanitary pumping, lighting, and other systems also may rely on adequate electrical power.

Standby power should be available via either a permanent standby generator or by having connection points for a temporary generator.

Consider whether there is adequate power distribution within the building to meet the needs during normal use as well as during a crisis, as well as which systems need to be on a generator or essential power system. Owners should also evaluate the location of the facility, how it is integrated with the overall utility power grid, and what the reliability of that grid may be under normal operation and during a crisis.

The use of the facility during a crisis and the types of patients anticipated will also weigh into the decisions associated with electrical power. Other key electrical considerations to accommodate temporary patient use may include:

Additional outlet locations in key areas

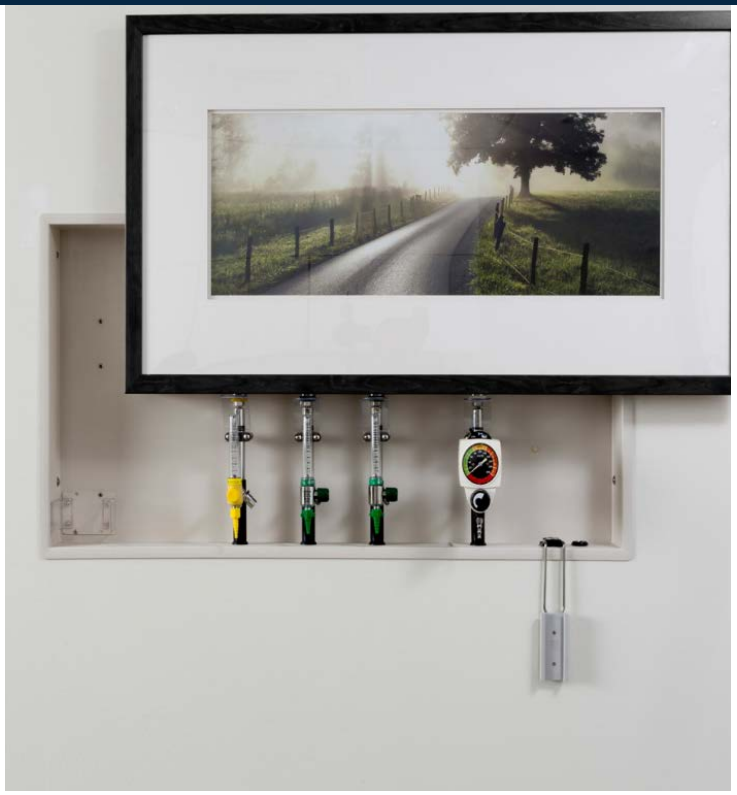
- Lobby and triage spaces
- Exam spaces that will be used for patient care
- Other spaces, such as training rooms or physical therapy gyms, that could be converted for patient use

Lighting

- Indirect lighting fixtures for patient care areas
- Multi-level switching or dimming for patient care areas
- Disinfection lighting for toilet rooms

Power

- Standby power system options
  - Permanent standby generator
  - Planned connection points for a temporary generator
- Proper, code-compliant transfer switches
- Power for segregated areas or the entire facility



Access to medical gas outlets can be concealed behind artwork in MOBs when not needed during normal operations. (Photo by Modular Services)

- Heating and cooling system power needs to allow continued operation
- Location of generator and fuel supply including access for fuel delivery
- Standby power for at least one elevator

Mechanical systems

The anticipated type of patients who may be seen at this facility during a crisis and how the facility will be used will inform the mechanical system requirements for the MOB.

Each healthcare system's needs will differ depending on answers to big picture questions such as: What is the anticipated acuity level of the patients? Are any isolation or negative pressure spaces required? How long will

patients be in this building? What is needed to keep staff and patients safe and comfortable and allow the building to operate as needed?

Any changes or system enhancements made for the sake of pandemic preparation should not have a negative overall effect on the building efficiency and operational performance under a normal operating scenario. If system design sacrifices cost-effective operation, the owner or tenant could end up spending significantly more each month while the building is operating in its normal state.

Key mechanical considerations include:

- Medical gas systems and provisions
  - Where will gasses be used? Patient spaces? Lobby and triage spaces?
  - Individual bottles and hard pipe to key areas for connection to cylinders or tank farm
  - If portable bottles are used, plan for secure cylinder storage
  - Electrical and piping connection points for compressors/vacuum pumps
- Negative pressure areas (depending on acuity level of anticipated surge patients)
  - Options for 100% outside air operation
  - Exhaust ducts and fans for key spaces in lieu of plenum return
  - Space, duct, and electrical connections for portable filter units to create airborne infection isolation rooms (AIIRs)
  - Duct and electrical connection points for temporary exhaust fans
  - Impact of plenum return on system operation and cleaning after surge event ends
- Air treatment
  - Review systems and size for increased filtration
  - Increase ability to provide humidification above 30%
  - UV systems for disinfection
- Domestic water supply
  - Hands-free fixtures/sensor fixtures
  - Confirm hot water system capacity and redundancy

Technology and security systems

Connectivity of off-campus buildings, such as an MOB to a data center or the main hospital campus, is important for normal operations and is crucial during a crisis or pandemic. Some facilities, depending on location and use, may not need security systems during normal operations, while others may use cameras, access control, or a combination thereof.

The need for these systems to function and support operations will likely increase during a crisis or pandemic and, as with many other building systems, accessibility and flexibility of the technology systems will be key. This

Additional technology such as a nurse call system need to be considered for an MOB that will be utilized for acute care during patient surge events.

includes the building wireless system's ability to support additional systems, the location of hardwired data outlets to support temporary needs, and how the building security systems and access control systems will be able to support the needs of the facility.

Items to consider include:

- Additional communication outlets in lobby and triage areas
- The need for a nurse call system, whether wired or wireless
- Data cable infrastructure
    - Space and access to pathways to install additional low voltage cables to support additional systems including:
        - Added wireless access points
        - Nurse call system
        - Camera systems
        - Security/access control
- Limiting/monitoring public access to the facility
- Robust wireless infrastructure to support operation of additional systems

Every solution is unique

Although there is no way to plan for every possible scenario or crisis, using what we have learned from the COVID-19 pandemic can help healthcare organizations prepare their MOBs to be adaptable in the event of a future crisis or infectious outbreak.

All owners and organizations will have a unique set of needs and parameters to consider. But following the design considerations outlined in this paper will assist in arriving at a similarly unique solution for the mechanical, electrical, and technology systems that will provide their MOB with flexibility to adapt to their organization's needs.

Every minute counts in a crisis or pandemic event when equipment and material availability become limited. By starting the planning now, you can begin to make the changes that can increase your MOB's ability to accept and treat patients during a surge event while keeping your staff and patients comfortable and safe.

Learn more about MOB design considerations for pandemic preparedness by contacting the authors.

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