

Mock-ups: Helping Hospitals Fit in Their Future Home

As designer, how many times do we walk into completed project spaces and feel that while the overall design succeeded, certain details should have been refined. Post-occupancy evaluations often reveal particular functional elements that could have been improved through greater client dialog. With so many design tools at our disposal, such as three-dimensional computer modeling and animation, the benefits of investigating key spaces with full-scale physical mockups can be easily overlooked. In healthcare design, we find the mockup process essential in facilitating client critique at critical moments of the design process.

Clients can be overwhelmed in the course of designing a new hospital. Soliciting their input is fundamental to a successful building solution. Designers have the responsibility to develop a communication process that extracts the key information to achieve the client's project goals and responsibly apply their resources. Fundamental planning blocks such as the patient room may be repeated up to 300 times and must be correct. Spaces that house sophisticated and expensive medical technology need to provide absolute safety and efficiency. Design decisions can easily impact lifesaving procedures where time and space are critical.

The mockup process should parallel the early stages of programing and planning. Execution of the first stage typically occurs with tape on a large open floor area to diagram full scale room plans. These diagrams map fixed floor space elements such as door openings and structure. The client team and design group place key equipment and furniture to confirm basic square footage assumptions and early function/ flow concepts. Many clients have difficulty interpreting typical design communication tools such as plans, perspectives, and scaled models. Bringing them into a full-size illustration allows them to place elements, understand orientation, and test clinical use patterns. Not only mocking up space, but also simulating process provides real world and real time evaluation and feedback. This first step often brings some of the most insightful comments to light as user groups feel at liberty to offer critique and suggest modifications; nothing is permanent or precious at this point. Testing a new idea is as simple as moving tape on the floor. Being done at a very early stage, these mockups also allow for timely modification of space programs and adjustment to project resources and budgets as necessary.

During early schematic design of the Wishard Hospital Replacement Facility in Indianapolis, IN, the relationship of ambulatory clinic modules to arrival, registration and waiting areas was questioned. The planning concept and site restrictions led to a long, narrow front of house space that concerned the client leadership team. Their basic questions made progress difficult. Ultimately HOK found a large parking area and painted out the full extent of the front of house space. Concrete understanding of the

actual size and layout allowed confirmation of the functional flow, allowing the design team to progress confidently to the next phase. While Wishard's investigation was at a macro scale, this early mockup process can also confirm smaller details such as door size. By taping the exam room door swing at various sizes for the University of Missouri Medical Center project, the client could understand the clear floor space requirements of an oversized door relative to a typical door. This simple investigation facilitated the minor decision to stay with a standard door size; one with significant project implication when applied over a large quantity of rooms.

With basic room sizes established, three-dimensional mockups can proceed. Depending on budget and space, clients may choose to build rooms of rigid foam sheets, or more substantial studs and dry-wall. Moving from simple tape lines to volumetric space provides a leap in communication. Typically done during late schematic or early design development, walls and built-in elements provide a more meaningful stage for equipment and furniture testing. Electrical outlets, data hook-ups, and medical device connections may be examined and located for optimum performance. These elements can be simple paper images taped to the walls and moved to review different scenarios. At this stage various stakeholders, such as nursing, respiratory, clinical engineering, and patient/family advocates should review the mockups together. This allows participants to interact and build consensus regarding the optimum organization of critical room components. All fixed elements such as millwork and plumbing should be modeled. With these fixed landmarks and walls put in place, procedures can be accurately simulated and various medical devices may be placed to evaluate various patient care schemes.

At the new Cancer and Critical Care Tower for The Ohio State University in Columbus, Ohio, critical care and bone marrow transplant teams simulated patient cardiac arrest codes and other crisis situations. The mockup rooms provided the opportunity to quickly rearrange elements and refine procedures. In the code simulation a number of medical personnel, the crash cart, event recording tools, and other medical elements enter the space in a matter of seconds. The prescriptive protocol requires each individual to perform a specific duty. Devices, monitors, and team members must be visible. Cords, leads, and tubes can become hazardous if not controlled. This laboratory approach to design of the key rooms can make the difference in life-saving seconds. The rough state of the mockup room empowered the OSU users to suggest changes. Between each simulation, designers asked questions and elements were moved to refine the process and increase efficiency. Interaction in the physical space provided more insight than conversation over plans and elevations. This fluidity of investigation also helped administrative leaders and the design team to challenge the status quo and encourage users to explore new ways of working.

At Wishard Hospital, nursing and leadership requested a footwall configuration with counters, a desk unit and wardrobe. The desire to provide built-in elements to create a more organized and attractive configuration needed to be tested. When assembled with rigid foam, it became clear that what appeared reasonable on paper actually presented a problem. Once required equipment, carts and waste bins were placed under the counter it needed to be raised to 44" above the floor, an unusual proportion that nursing found not very functional. The family desk was deleted in favor of a movable side table in the family zone and the wardrobe was reduced in size. The design team also suggested that fixed elements such as the wardrobe be wall-hung off the floor for greater flexibility and serviceability. On paper the footwall was just what Wishard requested, but the mockup investigation opened an option previously not considered. Without the experimentation and discussion facilitated through this process, Wishard may have built patient rooms they found disappointing. Additionally, the change resulted in a significant reduction of millwork with substantial cost savings.

The OSU mockup process yielded an even more significant discovery. The entry into each Acute Care patient room followed the 10 degree angle of the canted, inboard toilet rooms. During the planning stage and in the early two-dimensional taped mockup the configuration appeared sensible and potentially offered additional privacy from the corridor to the room interior. Once walls were placed along with doors and the caregiver station, it became obvious that the cant made bed movement in and out of the room difficult. At this point with walls and components constructed of rigid foam, adjustments to the room entry were easy. The design team made modifications in the evening and had a revised room entry ready for user evaluation the next morning. The basic cut and paste approach of mockups offers quick modification; as different ideas emerge, one simply rearranges the parts. Just as the typical design process uncovers options, mockups provide a full scale environment for direct, real-time feedback from the client.

The presentation of the mockup in a white-box format at this phase also narrows the focus to functionality and form. Without the potential prejudices of color or finish, the design team can limit variables of the evaluation. The process concludes with consensus among users and confidence to advance the solution to further stages of development.

With agreement on configuration, clients may choose to conclude the mockup process or continue to a more finished state. Moving to finished mockups requires a budget commitment, complete mockup construction documents, a contractor, and an acceptable location. Discussion and agreement regarding

the final product is essential. The client may choose to build a more detailed form-and-function scheme with functional millwork and lighting, or commit to execution of a fully finished and appointed room.

OSU made the decision to take all key rooms, Critical Care, Operating Rooms, Interventional Radiology, Acute Care, Bone Marrow Transplant, and Clinical Workstations to a more substantive form and function, white-box format with gyp board walls, ceilings, operable millwork and functional lighting fixtures. In this venue they tested light levels, actual hook-ups of gases and utilities, and functionality of hardware and storage. With each increase in detail, HOK facilitated a greater degree of investigation and offered OSU more opportunity for refinement. Typically, we find that projects taken to this mockup level have broad stakeholder participation and satisfaction that all important issues have been vetted. OSU found this to be true and agreed that design goals had been met. With the exception of an Acute Care patient room that will be fully finished, the mockup process was concluded and HOK was authorized to complete construction documents.

Fully finished mockups have many different benefits. They provide the opportunity to refine interior design and improve on architectural detailing. Clients however, need to understand the cost of this detailed study. OSU's Acute Care finished mockup is estimated to cost approximately \$85,000. Wishard Hospital made the decision to advance all of their key rooms, Acute Care, Intensive Care, Emergency Exam, Clinic Exam, Resuscitation, and Neonatal Intensive Care to the finished stage. Each of these spaces became a place for product review. Various furniture pieces were reviewed and evaluated. Subtle refinements impacting patient and family experience were accomplished. Artwork placement and accessory appointment were nuanced, providing the very best patient/family experience. Additionally, it offered environmental services the opportunity to understand maintenance requirements and to start early with revising service protocols. Wishard is also leveraging these finished spaces, utilizing the mockup rooms for philanthropy, public relations, and staff communication. Wishard views their mockups as a valuable tool facilitating project rollout and change management.

The mockup process is a key communication methodology that provides for broad understanding, dialog, and support. The approach encourages a significant variety of constituents to be experimental, in a non-intimidating format. It provides clarity for users that find two-dimensional drawings baffling. The simulation opportunities that mockups provide offer one of the most concrete ways of achieving innovation, consensus, and confident agreement.

Biographies:

Mark Banholzer AIA, LEED® AP
Vice President/Design Principal
HOK
60 E. Van Buren St. 14th Floor
Chicago, IL 60605
Phone: 312.782.1000
Fax: 312.782.6727
Email: mark.banholzer@hok.com
Website: www.hok.com

Mr. Banholzer is the design principal for healthcare interior architecture and design in HOK's Chicago office. He has dedicated his career to the design of architectural and interior environments that demonstrate constant concern with humanistic values and holistically integrate with building systems and exterior design. He has designed definitive healthcare spaces for institutions such as The Ohio State University, Northwestern Memorial Hospital and Indiana University Hospital. His creativity and capacity to surpass ordinary expectations has resulted in over 25 years of award-winning design efforts.

BickVanh Cam LEED® AP
Designer/Medical Planner
HOK
60 E. Van Buren St. 14th Floor
Chicago, IL 60605
Phone: 312.782.1000
Fax: 312.782.6727
Email: bickvanh.cam@hok.com
Website: www.hok.com

Ms. Cam is a designer and medical planner in HOK's Chicago healthcare studio. She draws on experience in public health to create compassionate and functional environments for cancer patients and other special-needs populations. Ms. Cam has worked on some of the most high-profile healthcare projects in the Midwest including Wishard Replacement Hospital (Indianapolis), University of Missouri Health Care System Patient Care Tower/Ellis Fischel Cancer Center (Columbia), and The Ohio State University Cancer and Critical Care Center.