

Making Room for Medical Technologies (5)

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Electrical, telecommunications and space needs of new diagnostic and operating room equipment force facilities to adapt

There's a technology race in healthcare. Hospitals and private medical groups are investing in new medical and information technology at an often frenetic pace. The goals are to improve patient outcomes, enhance patient safety, increase market share, decrease operating costs and boost profitability.

Today's "must-have" and emerging technologies are affecting the planning and design of new facilities and renovations of existing facilities. To accommodate new medical technologies, facility executives are increasing floor area and floor-to-floor heights in new facilities, revising layouts in traditional hospital spaces, such as the operating rooms and the emergency department, and improving infrastructure for telecommunications,

electrical and mechanical systems.

Non-invasive Technologies

New technologies for minimally invasive or non-invasive medical procedures - in particular, imaging and surgery - have become essential for hospitals that can afford the equipment and the specialized training often required to implement it. Hospitals that have not yet installed positron emission tomography (PET) equipment which is primarily used in cancer detection and treatment monitoring, are allocating space in new and renovated facilities to accommodate it.

Among the newest non-invasive imaging technologies is the electron beam tomography (EBT) scanner, which is

used to perform the so-called “virtual colonoscopy” as well as upper and full body scans to detect asymptomatic cardiovascular disease and other potentially life threatening disorders. These heavily marketed imaging services are attracting fee-for-service patients who, in some cases, are undergoing these procedures on their own initiative and without referral or recommendation of their primary care physician. Installation of this equipment in existing facilities requires additional space and additional structural reinforcement. For example, existing hospitals strapped for extra space will convert a conference room or other so-called “soft space” adjacent to the imaging department to accommodate this new equipment.

The types and number of surgeries that can be performed using minimally invasive or laparoscopic techniques are increasing every year. As a result, many hospitals are converting traditional operating rooms into minimally invasive surgery or laparoscopic surgery rooms. This typically involves an almost total renovation of the room to accommodate ceiling mounted service booms that carry specialized equipment and monitors needed to perform these surgeries. Moreover, ceiling access is required to install cable runs for the video and monitoring equipment, medical gas piping and other items that are installed on the booms.

Generally, these operating rooms are larger than traditional operating rooms to allow for the overall increase in equipment, as well as adequate space for staff to move around the equipment booms. Room lighting

needs to be multifunctional. It must provide general lighting for room prep and clean up, bright lighting if the room is sometimes used for general surgery procedures, and dimmed lighting for laparoscopic or minimally invasive procedures where the surgeon is viewing the procedure on a monitor.

In addition, minimally invasive operating room layouts often include mini nurse stations that enable a nurse to monitor equipment. Equipment cabinets, not unlike high-tech entertainment centers, are being employed to provide quick visual and physical access to the computer servers and other devices that power some of the digital-video recording and communications equipment associated with the laparoscopic surgical technique.

More space, less space

Hospital rooms of all types, including those in intensive care units and emergency departments, are becoming crammed with equipment, including PCs and mobile equipment such as ultrasound units. This is partly caused by the increased dependence on technology in healthcare, in general, as well as the increase in the percentage of acutely ill patients among the inpatient population. As a result, these rooms must be enlarged, and conduit and junction boxes must be installed to accommodate cabling needs, telecommunications ports and power outlets.

As the use of shared, mobile equipment grows, corridors need to be designed with niches that enable equipment to be “parked” without blocking passageways. Another

solution is larger equipment storage rooms.

Digital transmission and storage of diagnostic images is becoming the norm for new or upgraded hospital facilities. Computer workstations with picture archiving communication systems (PACS) capability are being requested not only in central reading rooms, but also throughout the hospital. Those systems provide doctors with convenient access to diagnostic image reading. Which this saves space by eliminating the need for large filing areas to store films, it has increased the need for space to house computer workstations. Additional conduit and junction boxes, telecommunications ports and power outlets are needed to accommodate this technology.

Automated medication dispensing machines can reduce the size requirements for medication rooms at nursing stations. These units benefit both the hospital and the patient by reducing errors in medication dispensing and by ensuring a proper record and billing of the medication dispensed. They also accurately monitor inventory of medications.

Emerging Trends

The changes in technology that are transforming healthcare facilities are far from over. Several emerging technologies are likely to become major factors in construction planning within the next three to five years.

- Pressurized treatment and inpatient rooms: With increasing concern about infectious diseases, some

hospitals are installing air handling systems that enable designated emergency department treatment rooms and inpatient rooms to be switched from positive to negative pressure as needed for certain patient conditions. More widespread implantation is probably still a few years away.

- A related design trend that enhances infectious disease control, as well as patient privacy is the enclosure of emergency department treatment rooms with three solid walls plus a glass wall and glass door in front. The traditional use of curtains to enclose or separate the treatment cubicles is not compatible with today's standards for infection control, air distribution control and patient privacy.
- Electronic Medical Records: Computerized Electronic Medical Records technology can streamline hospital operations, increase accuracy and reduce medical errors. The use of this technology is expected to become more widespread over the next several years. AN electronic medication administration record (eMAR) software application is usually the hospital's first priority for expansion of its electronic medical records system. Implementation of this technology requires expansion of the IT infrastructure. Even if this new technology has not yet been purchased, new construction should consider it and include the installation of empty conduit, junction boxes, telecommunications ports and power outlets to allow for additional wiring and hardware that may be

installed at a later date.


- **Bedside Registration:** Hospitals have expanded the capabilities of their electronic medical records systems with portable patient registration devices. The benefits of these technologies often are first realized in the emergency department. IN an effort to enhance staff productivity and reduce patient waiting times, bedside registration and “electronic dashboards” are replacing the waiting room registration counter and the old marker board. Laptops and hand-held computer devices enable the staff to register the patient at the bedside, then download the information into the electronic medical records system.

In the Future

A number of medical technologies are available today, but rarely implemented because of cost, lack of specialized training or other considerations.

One such technology is robotic surgery systems, which

enable surgeons to operate with greater precision on certain procedures. Robotic surgery systems are being installed in hospitals with advance surgery programs. The additional equipment associated with these systems generally requires a larger operating room, a control room and appropriate cabling and outlets. Look for robotic surgery to become more widespread. Remote control robotics will enable a surgeon in one location to operate on a patient across the country or around the world.

There is no doubt that healthcare organizations will continue to use the continued advance of medical technology to increase market share, enhance patient safety, decrease operating costs and boost profitability. Accommodating new medical technologies today and planning for their implementation in the future requires foresight and flexibility. New construction, renovations and additions should be planned with maximum flexibility to allow for the implementation of new technology.  2004