Lighting the WAY

Medical illumination is a matter of form and function

By John Guzzon

Treating patients is an extremely important task. In order to provide proper care, it is best if the environmental conditions are at their most dependable levels.

Healthcare practitioners need to operate in clean environments with properly working tools. But above all they need to see — not just well enough to read the chart, but to treat the patient properly.

Yet, healthcare environments are unlike any other. Lighting needs don't always include treatment areas, but also a morass of different environments — from cafeteria to surgical suite. Sometimes, life and death situations play out on a 24 hours a day, 365 days a year scale. At other times, daily activities such as staff meetings and linen changes dominate. Consequently, medical environments contain some of the most disparate lighting environments of any industry.

General area lighting

Hospitals are infamous for their endless corridors and seemingly endless waits in the aptly labeled rooms of the same name. But by using the tools of the contemporary lighting professional, these spaces can have more life.

"Since hospitals are becoming less institutional and more holistic in nature, lighting will continue to play a major role in creating a comfortable environment that promotes healing and wellness. We're finding that hospitals today are focusing on a 'hospitality look' by using a combination of direct and indirect lighting, decorative luminaries and artwork enhancement. Reception and waiting areas set the tone for the rest of the hospital, so it's important to create an area that puts patients, family members and visitors at ease," said Patricia Martini, electrical engineer and associate with Harley Ellis Devereaux. "When considering corridor lighting options, it is important to consider what patients experience when looking up. Patients who are being transported in stretchers need indirect lighting with low glare as they travel during their visit."

It is important to have balance among the architectural features, according to the experts, since they are so multi-functional.

"With today's multi-story atrium reception areas in new hospitals, the desire is for more lighting — especially natural light. Using natural light also supports the evidence-based design movement committed to healthier patient outcomes via healthier hospital environments. However, a mix of lighting sources and types is the ultimate answer for almost any healthcare space. Beyond natural lighting, a number of lighting alternatives can erase darkened alcoves or corners, highlight signage for wayfinding and provide task lighting for detail work such as reading. This mix of different lighting types is ideal for creating warm, comfortable, flexible and attractive environments for patients, staff and visitors alike," said Angela Byrd, senior interior designer with FreemanWhite.

The design of the structure also has a large bearing on how these ideas can be carried out, but generally, the most basic of choices comes down to downlighting or uplighting.

"Typically, we are using recessed downlights (cans) with compact fluorescent lamps in the general

Left: The Acute Care Unit at San Antonio Community Hospital in Upland, Calif. takes advantage of its physical placement in the hospital by using its natural light, care of exterior views and clearstories above.

Below: The clearstories at San Antonio Community Hospital allow for wonderful natural daylight to flood the care team work areas, while wall sconces, pendants, can lights, and indirect florescent fixtures complete the lighting package.

Bottom: The pediatric palliative care suites at Pitt County Memorial Hospital in Greenville, N.C. features lights that are on dimmers and switched independently.

SAN ANTONIO: JAMES BRADY; PITT: JERRY BLOW

waiting areas. These types of fixtures are highly efficient in terms of light output and energy consumption. At the reception desk we use a more decorative fixture to highlight the area, such as a blown glass pendant or a recessed downlight with decorative trim ring. By doing this, we are using the eye-catching fixture to serve as a wayfinding element for the patient," said Douglas Nelsen, Electrical EIT at the Omaha office of Leo A Daly.

But the days of the limited downlight or uplight choice might go the way of the dodo.

"I am particularly pleased to see that designers are specifying some of the newer multifunctional florescent fixtures as they provide both direct and indirect lights for a more balanced lighting level," Byrd said.

Patient rooms

Innovations in healthcare lighting are not only limited to the public areas. They have made their way into patient rooms, as well, in the ever-evolving quest for improved patient care.

"The multifunction florescent fixture has revolutionized lighting in patient rooms because it adjusts to meet every individual lighting need — whether it is a patient that wants soft soothing light or a staff member that needs to read a chart. As a matter of fact, I would like to see this light fixture become the new 'minimum lighting standard of care'. With the simple flip of a switch, these fixtures brighten for focused examination lighting, general room lighting, indirect ambient lighting, night lighting and patient task lighting. This florescent fixture can also be easily inserted into either a new construction or renovation project," Byrd said.

While new lights can obviously have a visual impact on the patient experience, improvements can sprout from surprising quarters.

"One of the most exciting innovations in patient rooms currently, is also the most overlooked: lighting control," Trevor Hollins, electrical project coordinator, HDR Architecture, said. "The typical patient room has an incomprehensible amount of lighting switches: general illumination, reading lights (patient bed and family areas are normally switched separately), exam light, chart light, sink area, and under-cabinet lighting. When you consider that many of these switches are three way switches — they are repeated in at least two locations within the patient room— you can understand why lighting is oftentimes completely inoperable by the patient and their family. Lighting is successful only to the extent that it can be intuitively controlled. A patient, doctor or nurse should be able to enter a room and immediately know what buttons to push to control the lighting in the manner they desire."

And any improvement in lighting is a positive influence on increasing the level of care.

"Studies have shown that the patient's environment is directly correlated with recovery time. If hospitals create a residential atmosphere for patients and provide multiple levels of lighting that is controllable by the patient, the better they will feel, and the faster they will recover," Martini said.

The use of nature's gift of life — the sun — is also important for better patient outcomes.

"The lighting should create a comfortable and tranquil atmosphere that promotes healing and calms the patient's uneasiness and fear. In evidence-based research, daylighting

The future is solid (state, that is)

Solid state lighting which is the exclusive purveyance of light emitting diodes, or LEDs, have been used in small applications for years. But that might be evolving into a more expanded repertoire. We asked a group of experts to look into their crystal ball and tell us what the future might hold for this emerging technology.

"Significant development of optical controls for LED lights are needed as well as gains in energy efficiency before they can become a direct replacement for fluorescent light sources. The potential for solid state lighting, however, is high. All of the issues listed above will be solved though further development of the technology. Within the past year, a number of companies have started to make luminaires that have impressive architectural uses. This is very exciting because it is proof that the technology is advancing to a point where it could be used as the main light source for a lighting design, and not in the decorative supporting role that it is now relegated to," said Trevor Hollins, electrical project coordinator, HDR Architecture.

"While general lighting fixtures utilizing LED sources are still in the works by several lighting manufacturers, the current use for LED sources is in patient-room night lighting. By using LED sources in lieu of compact fluorescent, it is capable to increase the life of the fixture by 40,000-plus hours. LEDs also have the ability to be specified with different colors, thus affecting the circadian rhythm of the patient. In the future, I believe that solid state lighting will begin to replace the traditional compact fluorescent recessed cans and eventually transition to replacing recessed troffers and fluorescent lamps," said Douglas Nelsen, Electrical EIT at the Omaha office of Leo A Daly.

"LED is an up and coming technology with a lot of promise for the future. There are giant leaps in the amount of light output we are getting from the newer LED units. We don't, as of yet, have a one to one replacement unit for the down lights and accent lights, but in the next few years we will have more options. This is definitely a technology that we will be applying to our lighting designs of the future," said Patricia Martini, electrical engineer and associate with Harley Ellis Devereaux.

"LEDs have been a part of healthcare environments for years – lighting our way through exit signs and emergency egress lights. But LEDs positive attributes have expanded its market into decorative commercial fixtures, wall sconces, mini-recessed down lights, and lamps. Since they are some of the newest technology, they are a bit more expensive than the compact florescent and incandescent fixtures we have been specifying for years. But as most things, we anticipate the cost to decrease over time as production and availability increases. I envision heavier use of LEDs, based on the lower maintenance and energy usage, in healthcare settings into the future," said Angela Byrd, senior interior designer with FreemanWhite.

"As the solid state market and fixture development progresses, LED technology will be utilized in accent and decorative lighting, as well as exterior lighting. There have been significant strides in lamping made in the last three to five years. Standards range from 3,500 K to 6,000 K (warm to bright white) lamps, HID lamping, and MR-16 bulbs which last longer, giving us the variety of light that is now becoming typical in healthcare," said Megan Gover, project designer with HKS.

has been shown to positively affect a patient's comfort level, perceived pain, and overall healing process. Many times their only view may be that of the ceiling and, therefore, positive distractions like backlit images are utilized. It is important to note that harsh, institutional lighting can have adverse effects on the patient's progress and overall feeling of well being," said Megan Gover, project designer with HKS.

Examination and office areas

Whether in a medical office building or a hospital, examination rooms are often neglected as merely 'use' rooms, but that might not necessarily be the case. For although the old adage is that the lobby makes the biggest impression, some experts disagree.

"It is a mistake to think that a person's impression of a hospital necessarily starts and stops at the entrance lobby. Only a small fraction of a patient's time is spent in the lobby; in truth, the average patient spends much more time staring at the walls in an exam room while he or she is waiting for a doctor. Consequently, it is crucial that both architecture and lighting in an exam room foster an atmosphere of calm and reassurance," Hollins said. "Solutions for exam room lighting should be unique for every hospital and developed through joint cooperation with architects and owners. Some component of indirect lighting should be incorporated, while the needs of doctor and patient also must be addressed. If these steps are taken, the examination area will be warm yet clinical."

There are also new innovations which are turning standard equipment from days gone by into relics.

"Flexibility is the key! Flexibility can be integrated into the lighting design utilizing dimming and switching capabilities, along with multi-function fixtures that offer the ability to switch between light appropriate for charting, examination, ambient/general, or night/reading. The industry is moving away from the traditional-lensed fixtures with a parabolic lens, and is now using enclosed fixtures that not only diffuse the light better but also help with infection control issues and ease of maintenance. Use of the proper Kelvin lamping also helps in the diagnosing of patients while 'warming' up the area, providing better rendering to the architectural environment." Gover said.

But perhaps most important is to bring in as many of the contemporary 'hospitality' influences while not crossing the proverbial and invisible line of good taste.

"Keying into feature walls, art work and architectural features of the space make the space less institutional. Using lighting to highlight these features

The emergency department at St. Joseph Hospital in Cheektowaga, N.Y. was designed to ebb and flow with the outside world. The clearstory above each care team area allows for daylight to flood the work areas, while indirect up-lighting illuminates the clearstory at night.

ED: JAMES CAVANAUGH

helps to light the space without using standard recessed luminaries to achieve the same end. The key to the design is a less sterile and less institutional environment," Martini said.

Not all space in a hospital or medical facility is used by those who are caring for patients. There are also the myriad of support staff members that need adequate lighting in their office areas. The general consensus is that indirect lighting is best.

"Indirect lighting tends to fill the space with light, therefore creating a soft, inviting atmosphere that has a highly uniform illumination. In addition, indirect lighting typically yields less glare for the occupants of the space which will result in fewer eye fatigue issues in the long term," Nelsen said.

Innovations also allow office lighting needs to be met in more efficient ways.

"With light harvesting during the brightest time of the day, lights can also be turned off, helping with the glare issue. New lamping allows for fewer fixtures spread over greater distances that also help decrease the HVAC loads within the buildings," Gover said.

Whatever the applications and whatever the needs, healthcare lighting products and designers are constantly striving to make a 'brighter future for all involved.'

"As architects and engineers, we are tasked to help alleviate that apprehension by creating environments that are calming and which make people look the best that they can," Hollins said. ■