

# HEALTH FACILITIES MANAGEMENT

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Baptist Memorial Hospital-DeSoto • Southaven, Miss.

## SOUTHERN CHARM

Patient tower blends past and future

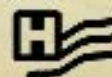
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American Hospital  
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# BIG CHOICES UNDER FOOT



Design and materials trends  
affect floor covering selection

by Patricia Malick, AAHID, IIDA, and Floss McGrady, IIDA



**Saint Michael's Hospital  
Milwaukee**

PHOTO BY HOWARD KAPLAN

All too often, patients shape their perception of care through the filter of their physical environment. Facilities are now used as more than just a caregiving space, but also as a physical manifestation of the institution's branded healing mission.

The design community is responding to this by working with hospitals to take cues from numerous sources such as the hospitality industry to change these perceptions. Innovative and progressive thinking has led to inviting and amenity-filled environments that enhance the patient's experience as well as contribute to improved clinical outcomes.

As billions of dollars are being spent over the next 10 years on major new health care facilities and the renovation of existing facilities, the selection of flooring materials will represent a significant decision in the design process.

Decision-making involves considering types of flooring, which materials are readily available, weighing pros and cons of performance criteria, as well as aesthetics, maintenance and cost. Health care facility managers will be challenged to select from a variety of flooring materials for a variety of spaces within the modern medical center.

Indeed, with millions of dollars being spent annually on flooring materials, the

**Tiling, using both carpet and hard surface flooring, can be easy to maintain and easy to use as a divider between active and more relaxed spaces.**

decision is one of the most important that facilities managers and designers can make. What are the flooring materials available and what factors affect their selection?

### Materials options

Current flooring materials used in health care facilities include both resilient surfaces (e.g., porcelain tile, linoleum, rubber flooring, sheet vinyl and vinyl composition tile (VCT)) and soft surface flooring (e.g., broadloom carpet, carpet tile and vinyl-backed carpet). For many years, VCT flooring was the most prevalent in the majority of clinical spaces, corridors and patient rooms, due to its durability, maintainability and low initial cost.

However, higher quality materials—everything from rubber flooring to antimicrobial carpet—have provided designers and facility managers with a myriad of options. Rubber flooring's non-slip characteristics have proven to be attractive in most clinical environments as well as bathrooms and other wet applications, while carpet continues to be used in nonclinical and other public spaces.

The use of carpet has become more flexible, with application advantages in public spaces and select corridors. Natural tile (e.g., ceramic or porcelain) is often the top choice for patient bathrooms, although the lower cost and versatility of rubber flooring has made it a popular alternative. Wood-look plank and welded sheet goods, as well as

blended materials, are popular in patient rooms and noninvasive treatment rooms (i.e., chemotherapy infusion, prep/recovery rooms in ambulatory environments) because of the material's ease of maintenance and resemblance to hospitality and residential applications.

### Aesthetics and visual cues

Aesthetics have become increasingly important in the health care setting. The physical environment is as much an extension of a hospital's brand as the quality of its staff. Additional initiatives, including the incorporation of evidence-based design (EBD) findings and research in hospital design, have indicated that interior design decisions impact everything from the effect of color and texture on patients' well-being to how indoor air quality improves patient recovery rates and staff absenteeism.

Studies have shown, and common sense indicates, that patients feel more confident and comfortable, respond more positively to treatment and recover more quickly when their surroundings are warm, inviting and more homelike. While "homelike" can be subject to numerous interpretations, its most basic meaning includes having the amenities, spatial relationships and mission to incorporate family at each possible interval of treatment and recovery. Creating an environment that encourages family support is dependent upon an institution's dedication to aesthetics.

Thankfully, the days of a half dozen variations of beige vinyl tile are gone.

The availability of numerous colors, textures and patterns in flooring materials has tremendously increased the designer's choices. Because our perception of a room is so greatly influenced by what is on the floor, the choice of flooring material is a critical one. By employing color, patterns and edge treatments in a patient room, for instance, the sterile and institutional feel that is often associated with hospitals can be minimized.

The size of a hospital can also make navigating seemingly endless corridors challenging for patients, which is why wayfinding and signage are important factors influencing the overall patient experience.

Color and texture changes can create repetitive patterns that guide patients toward a particular destination. For instance, at the Center for Women and Children at St. Joseph's Regional Medical Center in Milwaukee, patients are guided from the adjacent parking garage to registration and information through a corridor with carpet patterned to indicate movement. At Somerset Medical Center in Somerville, N.J., the oncology nursing unit has a repeating pattern in its floor, with large medallions indicating an intersection or major touch points. In Somerset's emergency department, an intentional variation in porcelain tile color provides a distinct pathway for visitors and patients directly from the entrance to the registration desk.

Ceiling treatments—direct and indirect lighting, skylights, recessed patterns and varying heights—can also



**LEFT** A geometric flooring pattern can capitalize on design cues from other architectural elements as well as encourage movement through connecting corridors and spaces. **RIGHT** A designated pattern can lead visitors to the main touch points.

complement flooring motifs to express prominence of an area or provide a landmark to orient patients and staff.

### Acoustic control

EBD findings have also delved into how noise may contribute to medical errors and sleep disruption, leading designers to conclude that acoustic and noise control are crucial in the hospital setting.

Noise is generated by foot traffic, movement of carts and equipment, conversation and intercom systems. The sound-attenuating and absorbing qualities of flooring can vary greatly. At one end of the spectrum, carpet provides the greatest degree of noise control. Traditional varieties of resilient flooring possess some noise control characteristics, but to a much lesser degree. Rubber flooring occupies the middle ground as far as sound attenuation. Each of these floors present different qualities in terms of their resistance to moving equipment and wheelchairs across them, which can impact staff performance.

Flooring is rated based on its Impact Insulation Class (IIC), which rates sound absorption values based on the decibel level measured from the room below when the equivalent of five steel hammers strike a floor.

While the actual construction of the subfloor (concrete slab versus basic joist) influences the sound absorption, the finished surface provides the greatest variance in attenuation. For instance, the standard IIC rating is 16 (higher numbers indicate greater absorption). Ceramic or

porcelain tile has an average rating between 28 and 40; vinyl between 35 and 50; rubber between 40 and 60; and carpet in excess of 85.

In tandem with the sound absorption qualities, the noise generated by floor maintenance activity must be considered as well. Buffing machines for resilient flooring and vacuum and wet cleaners for carpeting create noise levels that can be objectionable in many areas of a hospital. Rubber and polymeric surfaces, on the other hand, do not require the same level of stripping, buffing and waxing to look clean, cutting down on equipment usage.

(As an aside, these surfaces, purposefully designed with a low-glare matte finish, often conceal scuffs and blemishes more effectively and appear less slick to patients with compromised vision.)

### Infection control

Infection control continues to be one of the most serious issues facing medical centers. Designers and facility managers must not only specify flooring based upon aesthetics or noise control, but must consider the long-term commitment each flooring material requires to maintain cleanliness.

With VCT as the long-prevalent flooring material, housekeeping staff has had a long history of familiarity with cleaning, maintenance and replacement of this material. It has also been popular due to its low initial cost.

Other, more costly materials may have qualities that match or exceed the versa-

## FLOORING AS /WAYFINDING/



Hospitals can be mazes, as anyone who has been lost in one can attest. With most medical facilities having numerous additions and renovations often cobbled together as land and funding became available, it's easy to see why they are referred to as medical "complexes."

Wayfinding has become an essential part of the design of the modern hospital. Although commonly thought of as signage (or environmental graphics), wayfinding actually includes all the visual cues that assist a person in getting where he or she needs to go. Flooring is one of the most important visual cues for directing patients and visitors.

Ever been in an older hospital where someone applied colored tape to the floor to get people to the right department? It's not too sophisticated, but it works on some basic levels. Today, designers can employ color, patterns and various materials to direct people within a medical complex. Color schemes that differentiate departments, floors or wings can aid in wayfinding. Accent colors, such as inlays and borders, can also be effective.

The use of varying floor materials help define public, visitor-only and private areas in the hospital. Flooring can define transitional, in-between spaces that signal a change to a more private space. The combination of colors and materials, used judiciously, are limited only by the designer's creativity.

When combined with well-executed signage, flooring can be an important part of maintaining flow and traffic in the modern hospital.—P.M. & F.M.



**A floor pattern with darker hues of the same material can soften transitions and provide additional direction for patients, visitors and staff.**

## FLOORING AS /BRANDING/



As health care facilities have evolved and competition between hospitals has increased, branding has assumed a much greater role in marketing to health care consumers. The image and feel of a health care facility contributes to its brand and flooring plays a role in that.

The quality of flooring material projects an immediate sense of the overall quality of the hospital. The floor is one of the first design elements noticed upon entering a facility, with a sense of purpose that should not be overlooked. Lobby and public entry spaces, in particular, set a tone in the minds of patients or family members entering the hospital. Stone or terrazzo floor in a lobby conveys a completely different impression than carpet or vinyl composition tile.

Colors and patterns in flooring also form a brand impression. Branding elements may appear woven into carpet or inset into resilient floor in a main lobby, elevator lobbies or other entrance points within the facility. Patterning in floors can express a sense of richness or an impression of caring. Floor coloring that complements the architecture and color scheme can reinforce the brand image. For instance, the use of pink connotes women's health issues, which is innately recognized by most every health care consumer. Color and pattern sends a message.

Does the choice of flooring materials contribute to or detract from a hospital's message and its brand? The skilled designer and facility manager will weigh that consideration thoughtfully.

—P.M. & F.M.

tility of the industry standard. Carpet, for instance, is perceived as very difficult to keep clean and as a likely place for bacterial growth; however, industry studies have shown that when proper cleaning procedures are used, carpeting presents no increased risk from infection while offering several aesthetic and acoustical benefits. Once again, rubber flooring products are being used successfully and offer the visual perception of being more sanitary. Rubber is nonporous, shrink-resistant and is typically laid in sheets, minimizing the seams where bacteria can often reside.

### Cleaning and maintenance

The appearance of cleanliness is critically important in shaping and maintaining positive patient experiences in health care facilities. Stain-resistant characteristics of the flooring materials should be examined carefully. Will special procedures be required? Is the hospital housekeeping staff familiar and comfortable with those procedures? Will additional training or equipment be necessary? Many newer materials require less-frequent or less-intense cleaning routines, creating the possibility to re-deploy housekeeping efforts elsewhere.

Floor maintenance represents a significant expenditure of the hospital housekeeping budget. In many cases, the cost of maintenance over a long period will exceed the original cost of flooring materials. The true cost of flooring therefore includes the original installed cost of the floor, manpower costs of house-

keeping staff, equipment costs, cleaning products replacement costs for flooring that has worn or become damaged or unsightly. This is where a judicious choice of materials can make a substantial difference.

Health facilities managers should prepare a detailed life-cycle cost analysis of any floor covering that is being considered. In general, flooring with a higher initial cost will often save money by virtue of the lower lifetime maintenance costs.

### Environmental impact

The environmental impact of every building material is open to consideration in today's health care facility. As stewards of patients' health, the modern hospital must be cognizant and sensitive of the unintended effects of building materials. Additionally, the effects of cleaning chemicals on patients and staff can be of concern. Does a particular flooring material off-gas or release a potentially harmful chemical after installation? Will the maintenance procedure require the use of potentially hazardous chemicals or odors?

Health care is among the last few major U.S. industries to adopt sustainable practices despite being one of the largest energy consumers. The low industry-wide profit margin has forced administrators to scrutinize every construction dollar spent, and the benefits of sustainable design were not supported by empirical evidence until very recently. The industry is now making inroads at developing green-minded facilities, with

PHOTO BY TOM CRANE



**A strong flooring pattern can fulfill a wayfinding function by serving as a landmark that helps identify important areas to patients, visitors and staff.**

particular attention paid to the selection of materials with tangible return on investment.

Sustainable floor materials should be investigated. Sustainable materials are those in which renewable materials or recycled content have been used, or materials that use manufacturing processes with minimal environmental impact or lower energy use. Similarly, a truly sustainable building material can be recycled more readily when its usable life is over. The practice of cradle-to-cradle manufacturing is based on developing products that are not only durable throughout their first life cycle, but may then be repurposed for an additional life cycle with minimal byproduct.

In terms of environmental concerns and benefits of several specific materials, rubber flooring has increased in its popularity due to versatility of the surface, the lower effort required for its maintenance and the low pollution associated with its manufacturing. Natural rubber is also a sustainable resource; the rubber tree plant grows quickly in a variety of climates. Carpet can have both environmental benefits and concerns, largely dependent on the natural composition of fibers and adhesive qualities used during installation. Artificial carpet produces a variety of chemical byproducts during its manufacture and recycling may be limited. The manufacture of some hard flooring products can emit pollutants. The cleaning routine of these hard flooring materials can also emit indoor pollutants. Careful selection of materials, such as no-wax flooring that

requires only a neutral cleaning solution, is critical to improving the sustainable qualities of a new construction project.

### Contemplating cost

Initial cost is often the primary factor when selecting flooring materials. This is the factor that will create the greatest challenge to the facility manager—justifying a floor material with a higher initial cost but lower lifetime cost over a less expensive initial product that will have a higher maintenance cost over time.

Because these two expenditures come from different budgets (capital budgets for building construction versus operating budgets for maintenance) and at different intervals, this can be problematic. Nonetheless, when life-cycle analysis is applied to flooring materials, usually a higher initial cost can be justified over the long term.

Facility managers have been utilizing this approach for a number of years; particularly in the selection and operation of building mechanical equipment, where rising energy costs have forced a re-examination of all energy-using systems in a hospital. Flooring costs can be analyzed in a similar manner.

One of the approaches to effectively examine cost is the overall life-cycle cost analysis of varying products. For instance, when examining the installation of carpet versus VCT, cost factors for carpet include installation, removal and reinstallation after 15 years (assuming a 30-year life span for VCT).

On average, the cost of carpet would exceed VCT by nearly 225 percent. Conversely, VCT requires extensive labor and materials for its maintenance, making the 30-year cost for house-keeping nearly double that of carpet. The 30-year life-cycle cost for carpet proves that the higher initial investment results in substantial savings over the life of the health care facility.

Initial costs must be balanced against the performance of the floor in the health care setting and the attendant life-cycle costs. While these factors are crucial in decision-making during design and construction, the commitment of staff and administrators to provide the capital support and resources to maintain these materials are the most critical to the products' longevity.

### An informed selection

By considering aesthetics, acoustic properties, indoor air quality, infection control, cleaning, maintenance, environmental impact and cost, health facilities managers and designers will be able to make informed selections that dramatically contribute to the patient's total health care experience. ■



Patricia Malick, AAHID, IIDA, is a principal and vice president, interior design, for Array Healthcare Facilities Solutions, King of Prussia, Pa. She can be reached via e-mail at [pmalick@arrayhfs.com](mailto:pmalick@arrayhfs.com). Floss McGrady, IIDA, is a principal and senior interior designer for Array. She can be reached at [fmcgrady@arrayhfs.com](mailto:fmcgrady@arrayhfs.com).

LEFT PHOTO BY JEFFREY TOTARO; RIGHT PHOTO BY TOM CRANE



Alfred I. duPont Hospital for Children  
Wilmington, Del.



LEFT A color can be repeated in the fixtures, walls, ceilings and flooring to tie otherwise unrelated finishes together.  
RIGHT A wood-look floor treatment applies a more residential feel to a hospital space.