Planning for the future of healthcare needs to be a holistic process; using all of the team’s design skills to make the best total environment for patients and their care. Interior design is a critical part of this process, and must be part of the design process from the project start, not just the application of interior finishes and furnishings to a building design.

Successful healthcare interior design will integrate the landscape design and the building architecture with the interior architecture, in order to create seamless transitions between levels of care, define a sense of place, reflect a hospitality environment, embrace patient privacy and dignity, develop a brand image, and most importantly encourage healing. The designs of interior spaces have been shown to impact human behavior, evoke emotion, assist in awareness, allow for healing, and aid in accessibility.

From a process standpoint, fully integrated interior design needs to begin with the confirmation of the program and space plan. It becomes important for the interior design team members to part of the design process from the very inception of the project. Understanding and sharing in the development of the design concepts and project goals insures an integrated team approach. Interior design team members work collaboratively with the architectural and engineering team to create an efficient program and effective healthcare environment.

Hospitality Environment

The Evelyn H. Lauder Breast Center of Memorial Sloan-Kettering Cancer Center and MSKCC Imaging Center. Waiting. Image © Chris Cooper. Courtesy: Perkins Eastman
The goal for the healthcare environments we create is to avoid an institutional look and feel. Even the most critical level of care should attempt to emulate an inviting, hotel-like environment and steer away from a cold, clinical feel. Public spaces within healthcare facilities have evolved to take on the look and feel of hospitality focused environments and inpatient spaces should include at least some of the amenities of home. Dining and cafe environments should reflect the feeling of restaurants found in the surrounding community. Numerous amenities for patients and family should be included, such as boutiques, spiritual spaces, cafes and educational kiosks.

All of these elements should be designed within a hospitality context.

Hospitality environments evoke memories of pleasurable experiences; it is from this we draw inspiration on how to address lobbies, reception areas, waiting rooms, elevator lobbies and the like. Additional influencers from the hospitality market include the quality of finishes and furnishings along with lifecycle costs regarding the frequency of interior repositioning.

Color Theory for Healthcare

Colors have a strong impact on any space. They can create interest, provide contrast, define volumes, elevate moods, invigorate the senses, inspire the mind, enhance skin tones, enhance food, and even stimulate your appetite. Color and light, when combined, provide essential architectural details that enhance an environment.

Color and light in healthcare environments are especially critical, in terms of their clinical and emotional impact. Because a patient’s appearance and skin tone can be an important part of their diagnosis and care, the use of natural and full-spectrum light is important. At a minimum, the use of yellow or blue colors or lighting which will alter the visual skin tone need to be avoided. Color also has underlying emotional effects, in which strong colors or dark colors can provoke agitation or depression. Color choices in healthcare need to involve the clinical staff and be appropriate for the type of facility, not just a fashion or design idea.

Within these clinical limitations, the designer can experiment with palettes. Color can be paired with a varied hue (a varying shade of the same color), an adjacent color on the color wheel, and/or a color opposite on the color wheel. Warm colors provide energy, cool colors are calming, and neutrals create balance.
Key points to consider:

- Avoid yellow where reflected onto patient skin tones in clinical areas
- Specify colors that are not so dark that they are perceived as black or so subtle that they appear dreary.
- Provide contrast between the horizontal and vertical planes to provide better visual discrimination.
- Choose floor finishes that are not slippery or have a high-gloss appearance.
- Limit use of mirrors on walls to create the illusion of space, as this can cause confusion and disorientation.

Lighting

The key to good lighting design is the even distribution of light and the provision of similar light levels from one space to the next. A brightly lit area adjacent to a dimmer area will make the two areas appear darker and lighter than if they were separated.

Memorial Sloan-Kettering Cancer Center: M-2 Surgical Suites. Lobby-Waiting. Image © Chris Cooper. Courtesy: Perkins Eastman

University of Virginia Medical Center. Reading Room / Workstations. Image © Boris Feldblyum. Courtesy: Perkins Eastman.

General Guidelines

The following points are essential to the design of a successful lighting system for any senior space:

- Energy-sensitive design
- Even distribution of light levels on the floor surface so as not to create visual barriers of dark and light spots
- Use neutral spectrum or full spectrum (daylight) lamps and fixtures
- Install evenly distributed non-glare lighting
- Provision of transition areas to give the eye time to adjust to spaces with different levels of light
- Task lighting for staff and visitors
Wayfinding and Signage

The wayfinding and signage system in any building can be an important aspect of patient and visitor comfort, especially for those who may feel insecure in their environment. This is especially true in healthcare facilities, where patients and their families are often under stress. A wayfinding system should go beyond simple signage or color codes to become a multilayered system of spatial cues. Multiple wayfinding cues reinforce a sense of security for patients and family, who might feel intimidated by large spaces that are not easy to navigate. Just as on a highway, it is important to see clear directions on where to go, and to see reminders that you are on the correct route as you get closer.

Wayfinding is not something pulled from a kit and applied. It is the integration of an intelligent plan that coordinates various architectural and interior design tools including lighting, selection of finishes, artwork, floor coverings, and accent furniture or objects. It is a total system that must be considered as early as the initial planning and design sessions, and should be reflected in the architecture from the start, not added later in an attempt to correct a confusing layout.

Visual cues are an essential aspect of wayfinding. For example, interior windows and half-height partitions permit patients to view adjacent spaces. Integration of feature furniture pieces, such as display cabinets and artwork, with recognizable objects at decision-making intersections, become cues that help to orient the residents.

The type of flooring is another device used to assist with wayfinding. Color schemes developed around the flooring product may be alternated from floor to floor, which can be particularly useful in an environment where floors have similar programs, such as clinics or inpatient wings. The carpet or flooring material used in the public common spaces can have a significantly different appearance from the carpet or other flooring materials used in inpatient floors. Accent colors, artwork, and carpet design features, such as a border around the circumference of the elevator lobby, are all part of the multilayered system of wayfinding devices.

Finish Materials for Healthcare

Interior finishes provide the setting and backdrop for a healthcare environment. Many issues influence the choice of finishes. For designers the aesthetic
appearance may be a primary consideration; however, cost, appropriate construction for the functional program of the area, durability, maintenance requirements, visual effects of patterns, and the mobility constraints of the surface all must be considered as well. When considering interior product selection for healthcare environments, several issues are important:

- Durability and appropriateness for type of clinical program or function
- Maintenance: ease of cleaning, needs for periodic replacement and specific cleaning methods. Most products provide specific maintenance guides, which need to be followed to assure longevity of material.
- Life-cycle costs: Initial cost, maintenance cost, and operating cost over the useful life of the material.

**Flooring**

**Carpet:**

Carpeting can be a key decorative element in healthcare environments wherever use is allowable and applicable. Carpet offers comfort under foot and increases safety from slips and falls. Carpet also absorbs sound and provides traction which helps unsteady patients to prevent falls and to maintain their balance. Carpeted surfaces eliminate reflected glare, minimize visual disorientation and have a hospitality-based aesthetic which has been recognized as an asset to the patient environment. Flush transitions from one flooring material to another are vital. This minimizes slips and falls, which can be hazardous for recovering patients and difficult for wheelchair or walker-enabled traffic.

It is very important, however, to install carpet with the correct fiber construction and moisture-barrier backing systems appropriate for any spills and infection control. Two options are available in carpet: broadloom (rolled product) or carpet tile. Both have their place in today’s healthcare environments. Broadloom has less seaming and has more of a monolithic character. Carpet tiles come in various sizes, have multiple seams, but can be replaced easily if a stain occurs. Both broadloom and carpet tile have advanced in construction including: fiber types with soil repellant treatment, effective antimicrobial treatments, releasable adhesives, and improved backing systems.

**Carpet Considerations:**

- Carpet construction: Designers must be aware of the types of backings, fibers, types of pile (loop or cut), and weight of the carpet they are going to install, and be sure that they are specifying the appropriate carpet for each space.

*MSKCC Breast Center’s Imaging Center: Lobby Waiting. Image © Chris Cooper. Courtesy: Perkins Eastman*
products, for example, absorb moisture that is locked between the slab and the waterproof carpet, causing the sealant to degrade and crack. New Gypsum products are being developed to avoid these problems.

- VOC (Volatile Organic Compound-Free) adhesives: Minimize the use of products that produce off-gassing, as frail seniors are particularly susceptible to airborne contaminants, which may cause irritation to eyes and respiratory systems.

**Hard Surface Flooring**

Hard surface flooring is often necessary for areas such as emergency care, exam rooms and inpatient rooms where wet conditions can occur, washing is necessary, and infection control is at its highest. Hard surface flooring can include sheet vinyl, linoleum or other sheet materials, terrazzo, vinyl composition tile (VCT), porcelain pavers, ceramic tile, natural stone, wood, and engineered wood. New products that are easier to maintain, more hygienic, and less institutional in appearance continue to be introduced.

**Hard Surface Flooring Considerations:**

- **Glare:** Often staff view high sheen as signifying cleanliness. However, by definition high-sheen flooring materials produce significant glare and are thus not appropriate for healthcare facilities. Instead, there are low-luster finish products available, which reduce glare and often increase traction to prevent slipping.

- **Slip- and water-resistant options:** In wet areas, use flooring materials with a slip-resistant coefficient (relevant codes include the Static Coefficient of Friction Guidelines of the Americans with Disabilities Act, and the Occupational Safety and Health Administration [OSHA]). Slip-resistant products require more maintenance because their rough surfaces are more susceptible to dirt collection and are more difficult to clean.

- **Slab treatment:** See above section about moisture-barrier carpet.

- **Seaming:** Heat and chemical seals may be used for sheet goods, depending upon the product.

- **Transitions:** Transitions between flooring materials are very important because they help keep the edges of the material in place and prevent the loose edges that can cause tripping. Designers are encouraged to use vinyl transition materials that create a smooth, gradual transition appropriate for wheeled traffic. In addition, it is very important that flooring materials are carefully cut and adhered and that transitions are properly installed.

**Wall Covering**

There are two characteristics that concern the use of wall and ceiling finishes: flame spread and smoke development. These characteristics can be tested using ASTM E 84, *Standard Test Method for Surface Burning Characteristics of Building Materials*. Guidelines indicating limitations and requirements are indicated in NFPA 101 (National Fire Protection Association).

**Flame spread** or surface burning characteristics rating is a ranking derived by laboratory standard test methodology of a material’s propensity to burn rapidly and spread flames.

**Smoke Development** is the characteristic of a material to emit smoke when exposed to flame or fire.
Vinyl wall covering

Vinyl wall covering is relatively resistant to stains and abrasion, and is durable (depending upon the weight). Fabric-backed vinyl (as opposed to paper-backed vinyl and vinyl-coated paper) coverings are recommended for senior housing facilities because they are more durable and stain-resistant, and more stable since the fabric effectively adheres to the hanging surface. The fabric backing increases the abrasive strength as well. Vinyl is often chosen specifically because it is easy to clean and requires little maintenance. Because different coverings and finishes are compatible with different cleaning products, it is important to consult the manufacturers' cleaning suggestions. In contrast, due to mold issues, many designer and owner/operators are eliminating vinyl wall covering on exterior wall applications.

Vinyl Type I, II and III

- Type I, or light-duty wall covering (7–13 ounces per square yard) is typically used for residential applications. When the wall covering is located above a chair rail, so that it is not exposed to rubbing by cart or wheelchair traffic, this lighter-weight material can be used.

- Type II, or medium-duty wall covering (13–22 ounces per square yard) is specified primarily for commercial areas. This weight is the most commonly used when there will be high cart traffic or wheelchair use.

- Type III, or heavy-duty wall covering (22+ ounces per square yard) is reserved for use in high-traffic areas such as public spaces and food-service areas. This material weight is rarely used since its cost is higher. For high-traffic areas, such as a loading or service area, crash rails would be used to protect the walls.

Paint continues to be a popular wall finish for hospitals and medical facilities. Like vinyl, paint can be durable and low-maintenance, but it is important to use the appropriate type of paint for the correct area. For example, the wrong paint used in inpatient bathrooms or wellness centers can lead to cracking, flaking, chipping, and fading because of the high levels of heat, humidity, expansion, and contraction of surfaces.

Paint Considerations:

- Environmental concerns: It must be VOC (Volatile Organic Compound) free.

- Types and proper location: The choice of paint finishes is dependent on application. As noted above, the conditions in humid rooms mandate a more washable paint surface.
However, the benefits of increased durability and stain resistance offered by higher-gloss paints are balanced by the increased glare, which can be hard on the eyes. Thus, eggshell finishes are often recommended for most walls in healthcare facilities.

- Latex vs. Alkyd: There are two types of wall-covering paint: latex (water-based) and alkyd (oil-based). Latex paint, because of its vinyl acrylic binders, is more durable. It also dries faster, is easier to clean (requires no special cleaning products), is smoother, and is easier to apply.

- Surface preparation: Although paints differ in quality, an improperly prepared surface can shorten the life of even the most expensive and highest-quality paints. The surface to be painted should be smooth, clean, dry, and stain- and mildew-free. Primer should be used to render the wall surfaces consistent.

Fabric wall covering

The use of fabric wall covering is usually limited, due to budget constraints, maintenance issues, seaming difficulty, and time needed for wall preparation. Regarding durability and maintenance, if the process of cleaning the special wall covering is too complicated, it will very often not be maintained.

The inherent acoustic property of fabric is a positive aspect of the material. Fabric can be wrapped and glued to rigid panels and hung with Z-clips to improve the acoustic characteristics of a space. Another method, though higher in cost, is to stretch the fabric over soft or rigid acoustic material on a track system that permits easy replacement. The recommended fabric is one such as polyester, which does not absorb moisture and therefore will not sag over time.

Unless properly treated with flame retardants, fabric wall covering may have a higher flame spread and smoke development rating than other wall material options. The NFPA 101 Guidelines should be consulted for specific fabric ratings. Additionally, these materials are more easily stained and soiled, so usage should be limited to areas with less foot traffic and the excessive wall contact.

Ceramic tile

Ceramic tile provides a washable surface; however, the somewhat porous grout joints can be a maintenance problem and have a tendency to absorb liquids and odors. It is recommended that grout be sealed around toilets and urinals. The use of larger-size tiles helps to reduce the amount of grout. In lieu of ceramic tile floors in bathing and toilet areas, seamless sheet vinyl flooring with an integral cove base is a common alternative.

Wall Tile Considerations:

- Pattern: benefits for balance and defining horizontal and vertical planes
- Cost of materials and size of walls to be covered
- Transitions with other materials
- Glass tiles, backed painted glass, natural/indigenous stone
Furniture and Furnishings

The selections of the furniture and furnishings are the final touches in the interior design of a project.

Without the thoughtful choice of these items the spaces will look incomplete. It is important to select the best products at an appropriate price and not be locked into buying arrangements or preferred vendors. Furniture needs to appropriately reflect the overall design aesthetic. Often, for specialty healthcare institutions, furniture will be customized to meet patient needs, such as within a cancer care center.

Definition

Furniture, fixtures, and equipment (FF&E) is defined as the products within the environment that are not fixed to the building. These items can include: furniture, decorative window treatments and decorative pillows or cushions (soft treatments), art, accessories, interior landscape, and portable lamps. Consideration needs to be given to other items that can be owner provided or part of the FF&E that include: fitness equipment, spa equipment, educational equipment, audio / visual equipment, table top items and linens, and other similar items.

In the programming and planning phases it is critical during test layouts to use properly dimensioned furniture. The furniture shown in the drawings should reflect the sizes of the actual items to be used so the area planned is large enough to provide the proper accessibility clearances for wheelchairs or supportive devices such as walkers.

When selecting furniture for the various levels of care within a healthcare setting, the physical frailty of the users must be kept in mind. Although the patients using each level of care will vary (from a doctor’s office to rehabilitation to critical care), it is better to err on the safe side by selecting for the frailest. The selection of furniture should meet the following criteria:

- Proper dimensions: seat height, seat depth, arm height; style of arm: the arms must extend to the front of the seat so that they will support the weight of patients who lean on them for additional support. Seat heights need to be higher than for other types of users, and chairs must be firmly balanced and not able to be tipped forward.

- Density and firmness: The cushions must be supportive so that the bottom of the seat will not sink much lower than the height of the occupant’s knees but provides a comfortable seat.

- Upholstery issues: There are several treatments on the market that repel stains and prevent the passage of moisture through the cushion. The natural feel of the fabrics has improved greatly from previous years. Leather
is now also available through some manufacturers that is cleanable and stain resistant, has anti-bacterial protection and a water resistant finish. If the budget does not allow for leather, a good alternative to vinyl upholstery is polyurethane. It has the embossed grain of leather with a softer natural feel. A vinyl, polyurethane, or leather seat is typically used in high traffic areas. Textile colors and patterns should enhance the surrounding palette and design. Seating for patient areas needs to have easy cleanability, with a gap between seat and back cushions to allow liquids to drain off, and often with removable and replaceable seat cushions.

- Appropriate weight: Furniture to be placed in waiting areas or patient rooms with multiple functions and flexibility, such as stackable chairs, need to be light enough for staff and visitors to move while still providing a safe stable frame with arms that will not tip over easily.

- Code: In hospitals facilities all national and local codes must be followed in order to meet inspection requirements. There are specific standards in most codes for flame spread, fire resistance and smoke generation for healthcare furnishings.

**Art**

Growing research is showing that purposefully selected art can play a helpful role in healing sick people. It can actually reduce blood pressure, reduce the sensation of pain and minimize the need for extensive pain medication and offer a positive distraction in waiting areas.

Art collections need to be carefully selected for the healthcare environment where they will permanently reside. The objective of an art collection is to create an environment that offers soothing and peaceful visual experiences for patients and their visitors.

Most commonly used subject matter to create a calm and stress-free environment are:

- Waterscapes
- Landscapes
- Flowers
- Figurative art

**Access to Nature**

Spending long hours in a healthcare facility, either as a patient, family member, or employee, is stressful. Providing access to nature through natural views or gardens in healthcare settings has been shown to increase patient, family and staff...
satisfaction as well as foster access to social support, positive escape and recuperation from stressful clinical situations.

Most commonly used elements as access to the natural environment are:

- dynamic use of daylight
- natural ventilation
- access to water (both visual and acoustical)
- spontaneous interaction with nature
- sensory connections to nature
- fundamental natural forms
- use of local materials

Healing gardens in healthcare facilities can provide a setting for staff to conduct various therapies with patients, for staff to retreat from stress and provide an opportunity for patients and family to interact in a calming, natural environment. Positive mood change and reduced stress was reported within several post-occupancy studies of patients and families who use such gardens.

Key design considerations to consider for optimal garden use in hospitals and healthcare environments include clear visibility, easy accessibility, an encouraging familiarity, and a quiet sound environment. Carefully chosen, unambiguously positive art can provide both visual focus and inspiration.

**Natural Daylight**

If direct access to nature is not available, windows that allow for natural light have the additional benefit of providing views to that outside. This orients the patient and staff to the time of day and provides positive distraction for patients and their family. A research study in 1984 found that patients recovering from surgery recovered faster, had better emotional well-being and required fewer strong pain medications if they had bedside windows with
a view to nature (looking out into trees) that if their windows looked out onto a brick wall.

Even simulated views of natural environments, where no direct views are possible, have had possible effects. A study revealed that while using virtual reality as a distraction during infusion, patients experienced fewer adverse effects and fatigue.

**Security and Safety**

Hospitals have many concerns relevant to general safety concerns. The content of a hospital facility, such as drugs and infectious materials, need to be secured. Patients require protection following accidents, disaster or criminal activity. And violent or unstable patients need to be controlled within the facility, offering protection to both patients and staff.

**Eight Concepts to Consider when Creating a Healing Environment**

Patient-centered care is a primary design goal for healthcare facilities. While working with a variety of providers, including regional and community hospitals, academic medical centers, large international medical centers and specialty hospitals, these eight key concepts have been developed for consideration when designing for a healing environment.

1. **Focus on the needs and concerns of the patient and caregiver drawn from their circle of family and friends.**

Many patients need to be treated with utmost care due to the seriousness of their specific illness, negative side effects of treatments and/or the healing process from complicated surgeries. They often need assistance to get to and from hospital areas or to appointments for treatment and continued care. Many patients need to adjust the pattern of their lives to accommodate new schedules in order to enhance their healing process. They need the physical and emotional support of family and friends, and everyone in this extended group needs the support of the medical institution. During medical visits amenities such as educational resources, pantries, internet and television and gardens can create welcome distractions.

2. **Minimize stress-inducing environmental factors.**

Given the high levels of stress that patients and their families may already be experiencing, they do not need the aural and visual clutter that is usually prevalent in medical facilities. For example, hospital staff indicated that inpatient renovations, involving the installation of sound-absorbing carpet in corridors and other amenities, have resulted in lower levels of medication required and fewer nurse calls. Staff and faculty are now realizing that an improved
hospital environment can affect a patient’s condition.

3. **Preserving patient privacy and dignity.**

Given the invasiveness and discomfort of many treatments and prolonged hospital stays the need for preservation of privacy and dignity is self-evident. Conversations with patients and family need to be in private or semi-private areas. Family also needs space to deal with stressful situations and the opportunity to seek consult from medical staff.

4. **Provide positive and comfortable environments designing with a hospitality vocabulary.**

Hospitality environments recall positive experiences like meals out and vacations. Hospital environments, with the exception of births, recall negative experiences. Many patients experience negative feelings when needing to visit medical centers and hospital-based offices. By creating an environment that evokes a hospitality feel these negative emotions can be avoided. Because of the tremendous development of new materials for the hospitality industry that meet the maintenance and code requirements of healthcare facilities, this type of environment is much easier to create than it was a decade ago.

5. **Incorporate life affirming features.**

The incorporation of artwork, plants and even natural finishes, or finishes with an organic feel and texture, reminds patients and family members of the wonderful possibilities of life and gives them something positive to contemplate. Although they are difficult to maintain, the incorporation of water features create calming sounds and
are interesting distractions. Healing gardens are becoming welcome additions to hospitals, treatments centers and clinical facilities. This allows a brief get-away for patients, visitors and staff alike. Gardens can also be viewed from the inside as a positive distraction.

6. Accommodate rapid change in technology and treatment protocols.

Given the high initial cost of medical facilities, additional marginal spending required to accommodate flexibility and new technologies may quickly pay for itself in future staffing and renovation efficiencies. Designing for flexibility around imaging modalities and surgery suites is critical in hospital and clinical settings.

7. Separate staff areas and support space from patient areas.

In addition to facilitating the operation of the facility, this helps to reduce environmentally-based stress factors just as it does in a hotel. Ambulatory and clinical centers often have the greatest separation of staff (back of house) and patient (front of house) areas. This also enhances privacy features for both staff and patients.

1. Efficient use of the care team’s time with the patient and the patient’s time within the facility.

One very important feature of a specialty or clinical center with doctors’ offices, imaging, treatment, therapy, etc. under one roof is that the patient can do in one day what may take multiple visits at a hospital center. It also facilitates the ability for a physician to check the condition of a patient who is only scheduled for a specific exam or treatment. Other examples of this principle are organization of the facility so the nursing staff can visually monitor patient traffic to optimize the flow; and rooms where the clinical team can plan the next steps in treatment before the patient visit is over.

Conclusion

The interior design of a healthcare facility takes many aspects into consideration. Working from the programming phase throughout the design and documentation process is critical to ensure every detail effectively supports the initial concept established by the team and user group. Color palettes, furniture, materials, lighting and artwork all contribute to a calming setting, allowing all patients, whether inpatient or outpatient, to benefit from a healing environment. The ultimate goals are to consistently provide creative and innovative solutions designed within a specified budget, to meet all required codes and to offer an uplifting experience for patients, family and staff.