Dialysis Facility Design—Part IV: Color, Sound, and Materials

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The needs of building occupants should be the most important component of project programming. If neglected, the success of a clinic could be in jeopardy. Architectural considerations, both for the patients, who spend a significant part of their day receiving treatment, and for the medical staff, which spends all day working within the space, must be foremost among issues evaluated in the design process. When you address healthcare needs through design, you need to think about comfort as well as safety for patients and medical staff. This article, the final installment in a series focused on dialysis clinic design, will guide you through special design, color choices, and material selection—the final steps in making your clinic design safe and effective.

Design is a creative, technical, and social process that must address both generic issues and those specific to the dialysis unit as they relate to patients and staff while balancing the financial model, sometimes, it would seem, on the head of a needle that is constantly moving. This balancing act is what makes the design process exciting, challenging, and ever evolving.

The constantly changing nature of healthcare technology and the costs of that technology, along with the growing desire to improve quality of life and care, require the design of a dialysis clinic to be flexible and durable, as well as warm and comfortable.

After you have solidified your project plan and determined the number and type of patients you’ll accommodate and the level of services you want to provide, you should have a clear idea of the general space program you’ll need: the number of chairs, public spaces, staff areas, offices, exam rooms, and service areas. The next step is to determine how to approach the spatial design, color selection, and finishing materials of your facility to ensure that you create this balance between comfort and safety.

Gathering Ideas

Any new facility design needs input from the owner, manager, and staff and be looked at from a patient’s point of view, as all are interrelated and dependent on each other. The best way to obtain this information is through an interview process in which the architect acts as the facilitator to obtain information on the financial, technical, and comfort/quality aspects of the design that each group envisions. The architect usually also documents these interviews to maintain a clear library of information that will be the foundation for future design options, each with its own list of pros and cons.

Staff and Technical Needs

During the initial interviews with the staff (both clinical and nonclinical), technical elements such as equipment will be added to the space program in a room-by-room listing. This helps to assure more accurate projections for square footage and configuration of each room. A room matrix should then be developed to define the relationship and proximity between specific rooms. The room matrix helps to define functional zones, with groupings of rooms that support each other.

Interviews with the staff help to refine the general space program into a final detailed program. In my experience, it is very important to have the technical discussion at this level before starting any design layouts; otherwise people will be focused on the design rather than the technical needs of each room.

Circulation is always an important design factor, but in healthcare design it’s critical for evaluating the success or failure of a given design. Healthcare design must consider the public, patients, clinical staff, administrative staff, maintenance staff, and the circulation of clean and soiled supplies in and out of the facility. All these elements require some degree of isolation from and interaction with each other.

The circulation diagram also has to consider the locations of exits and the number of people using each exit in an emergency. In our practice we begin a schematic design by developing a circulation diagram with a room matrix superimposed over it. This type of initial sketch is called

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a bubble diagram. A room layout is then integrated into the bubble diagram in order to generate a schematic design with sizes that fit the available space.

**Patient Considerations**

After the technical elements have been used to create an initial design, patients and families should be interviewed next. This is not always an easy process, but there are several ways to approach it. If the owner or manager is an experienced or large operator, then patients and family members from similar facilities could be asked about what features they prefer and what changes would improve the existing facility. Another method for gathering patient and family input is to ask them to complete a survey and possibly even to select a small group from those who answered the survey to review the initial design. This is often used as a marketing and advertisement strategy.

**Flexibility**

The interview process will demonstrate the need to design flexible treatment service areas. Some people value more privacy; others want to be able to talk to their neighbor. Some may want extra space for family members, others may want Internet access, and children may want access to DVD players or video games. Some patients will want or be required to have a private room or an isolation room. The staff requires clear visibility and easy access to all patients and medical equipment. This need for flexibility is an architectural challenge, given the inherent inflexibility of the bricks, mortar, columns, and beams of a building. Further, every project has space and/or budget limits that need to be balanced.

**Separate Treatment Areas**

One design solution that provides a more flexible treatment facility is to create a series of treatment areas that can then be tailored for more or less privacy. As an example, if designing a 24-chair dialysis clinic that needs to account for 3 distinct types of patients, the space could be divided into 3 areas, one for 12–16 patients, a smaller area for 4–8 patients, and another area with possibly 4 private rooms for either VIPs or patients in isolation. The large open area could be for general treatment where...
people who can communicate with their neighbors in a rather typical manner. The smaller open area could be for children and/or young adults, patients who usually are more interested in video games and current music, or it could be for people who want to read, sleep, or engage in other quiet activities. The private rooms could then be occupied by patients who are very sick and patients who are immunocompromised and need to be isolated for their own protection. The private rooms can be separated by glass walls, which would control noise and infection yet still allow patients to be visible.

There is obviously a visual control issue for the medical staff, which could mean multiple nursing stations with separate staffs. One solution is to locate nursing stations in a back-to-back configuration and then use screen walls to separate the patient areas. This allows medical staff to be in close proximity to patients and still be able to back each other up in an emergency, while maintaining an acceptable level of patient separation.

Another approach is a cul-de-sac design, in which a small area is created for a grouping of 4–8 patients within a large open space that is then divided by a series of semiopen, half-height wall dividers. The main ceiling is 10’–0’ high, so the treatment area maintains a spacious, open feeling while providing small group areas and making a large number of patients visible to the staff. Each cul-de-sac can have its own design theme, and patients can be divided up in any number of ways: Ms. Smith could be in a separate area from Mr. Jones, or several teens can be together so they are able to talk.

This type of design also helps to keep the noise level down, as the sound is broken up by the wing walls, similar to modular furniture. Wing, or dividing, walls can be designed to almost any height, from about
the effect of windows or skylights by or no exterior windows, then create design medical spaces with minimal.

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Light and color affect an individual’s perception of space, so light and color must also be carefully analyzed when designing any large functional area. Many experiments have been done to design medical spaces with minimal or no exterior windows, then create the effect of windows or skylights by electric lights behind a mural. I am a firm believer that natural daylight is still an important factor and should be a primary design consideration for a long-term treatment area like a dialysis clinic.

Every person has a different perception of color and space. When first entering a large, open space, it may feel impressive, but after sitting in a chair without being able to move for 4–6 hours, the space may start to seem rather boring. The perception of those who want to sleep or read will probably change to annoyance if other people are talking or watching TV at a high volume. Having revisited several large dialysis clinics after completion, I found the nicest ones to be those with many windows, a large, open space, and high ceilings. The large spaces were divided into smaller patient areas by low dividing walls, with the nurses’ stations centrally located. This allows sunlight into the entire area. When planning for control of the light (through curtains or shades) allow for flexibility and individual tastes.

Dividing Walls
Dividing walls can also be used to introduce variety and color. By using a modular box theme, the dividing walls can be stepped to vary their height in a manner that allows more light and visibility at one end of a cul-de-sac, with lower walls, and more privacy and sound at the other, with walls stepped up to the ceiling. Dividing walls can also have shelves that can have artwork and plants, creating a warmer, more homelike atmosphere that is so important in the healing process. The modular boxes can be of different colors and materials for visual variety, which can be a stimulus to help patients stay more alert and for staff to take pride in their workplace.

The dividing walls can be used much like a modular furniture system to create storage cabinets that keep most medical supplies out of view while keeping them immediately accessible. As a healthcare designer and at times a patient, I believe it is important to make a treatment area as homelike as possible and to hide the clinical elements without hampering the medical service delivery process. Sensitive design can go a long way toward accomplishing both a homelike atmosphere and an efficient medical treatment area.

Color
Color has been talked about briefly. Everyone perceives color somewhat differently because of personal likes and dislikes of certain colors but, in general terms, light, warm colors increase light reflectivity and enhance the feeling of space, whereas dark, rich colors absorb light and make a space feel smaller and more intimate. Dark colors may be appropriate for a small intimate lounge or a home entertainment area but should not be used in a patient care environment. Yellows and light oranges should also be avoided, as they may make skin appear yellow and jaundiced, not a good idea for dialysis patients. It is better to use light shades of secondary or tertiary colors to add accents in order to help maintain the perception of light and to make the space feel larger.

Staff need a high light level, as reading fine print and working with small needles is a big part of their work. Even though white enhances light reflectivity and provides a sense of cleanliness, it is sterile and quickly becomes boring. Color is still one of the best ways to enhance a cheerful, homelike environment, which also makes patients feel better about the time they spend in the clinic and about the treatment they must undergo.

Paint
There are many ways to introduce color into the environment. Paint is obviously one of the most common

Space
A dialysis treatment area is usually most cost efficient for a medical staff when its a large, open area. Spatial perception then becomes a very important design consideration, as it can have a large impact on how patients feel about the quality of the facility and can thus affect patient perception of the quality of their medical treatment.

The staff can be similarly affected by the spatial perception of their work environment, which can in turn affect the quality of the medical service they provide. Obviously, the quality of nursing care is the most important factor affecting how patients perceive the care they receive, but both elements can either help or hurt the overall experience. The space should be pleasant both for the healing process and as a work environment.

4’–0’ up to the ceiling, depending on preference. Most common is a height between 5’–0’ and 6’–6’. The divider can be designed with sound-absorbing material, glass, or even open shelving, depending on how much separation is desired. The dividers are also functional, as they usually incorporate the medical services raceway to which patient treatment equipment is attached. The divider walls have the water, electrical, and data lines running horizontally through them, and they can also have built-in supply cabinets. The nursing stations are centrally located together, and each patient grouping area then radiates from the nursing station toward the perimeter walls.
and least expensive ways to do this. Much like in your home, cleanability and durability are key concerns with paint. To make paint easier to clean, a semigloss eggshell finish is typically used. To make it more durable, there should be at least 3 finish coats. Realize that it is still paint, so areas that require regular or constant cleaning should have another surface material. Other types of paints or paint-like coatings, such as epoxy-based coatings, make the surface hold up to heavy cleaning. Most cost about as much as inexpensive vinyl coverings; they usually have the disadvantage of not being repairable while the space is in use because of fumes.

**Wall Coverings**

Vinyl wall coverings are a very good way to introduce color, patterns, and texture to a wall surface. A wide range of cost/quality levels can be used. Vinyl wall coverings, like any other product, should be carefully selected for the specific uses of the area to be covered. A dialysis clinic has at least four major zones within it: public, office staff, patient treatment, and maintenance/service areas. Each needs a different type of finish treatment. Areas that require constant industrial cleaning may need a seamless or heat-sealed wall covering. These are extremely expensive.

Ceramic tile and plastic laminate are also very durable wall coverings, with numerous design options that can create a very pleasant environment, at a cost. To give a general idea of the costs, a typical quality three-coat system using good-quality paint could run $0.45–$0.75/ft². Some glazed coating systems could run $0.80–$1.80/ft². A good-quality vinyl wall covering should start at about $1.85–$4.00/ft², more if an exotic wall covering is used.

**Flooring**

Flooring is another area with almost limitless options in the types of floor systems available, depending on aesthetic desire, durability needed, and budget limits. Vinyl composite tile (VCT) is one of the most economical and relatively durable surfaces and can be installed for as little as $1.35–$1.75/ft². Color selection and design options have greatly expanded in the last 10 years.

One drawback to VCT is that it is typically available in 12′ × 12′ tile, which has the disadvantage of creating numerous seams that can harbor bacteria and enable water to get in, which can ruin the floor. Linoleum is in vogue again, but as a 12′ × 12′ tile, it has advantages and disadvantages similar to VCT.

A commonly used alternative to tile is sheet vinyl (SV), which can be installed in 10- or 12-foot-wide rolls with only one seam along the edge of each roll. The joints of a SV floor can be chemically seamed or heat-welded to create an almost seamless installation. Like vinyl wall coverings, SV comes in an unlimited number of colors and patterns. You can even custom-design with SV. Good-quality SV starts at about $4.00/ft² and can cost more than $10.00/ft² depending on the quality and the elaborateness of the custom design.

Engineered wood flooring and artificial wood flooring made from plastic laminated material are now used in certain clinic environments. Because of the potential for water spills, a dialysis unit probably should not use these types of material. Laminated wood flooring has overcome some of the problems of wood flooring systems in the past but is still of somewhat questionable use for a dialysis unit. Cork and bamboo are in vogue these days but also are questionable products for this area. If they are properly selected, using the advice of the manufacturer, installed with the utmost care, and had constantly available maintenance, the use of cork and bamboo would create a very warm, homelike environment.

**Balance**

In the not-so-distant past, healthcare design was very technically oriented and sterile. This has changed in the last few years, as the medical world has come to realize that the patient healing environment is extremely important and that the aesthetics of a design are an integral part of creating that environment along with the medical care delivery process. The additional costs involved in creating a warm atmosphere is a very small portion of the overall cost of care for a patient. Creating a proper balance between the healthcare environment and a warm, homelike environment enhances the patient healing process while creating an aesthetic, durable, and cost-effective facility.